

PERSONALITIES

By George F. Taubeneck

Pop Bottle Revolution

Readers who perused this page last week have been asking us: "What was all the rucus about in the final World Series game at Detroit, when the fans showered Medwick with pop bottles and fruit? Was Medwick really to blame?" Particularly have our St. Louis friends been anxious to know the real story of one of the most amazing flights of the year.

The history of the fracas, in case it's a bit hazy in your mind, runs about as follows: In the sixth inning of the final game, "DUCKY WUCKY" MEDWICK, who led the St. Louis batsmen in the series, tripled to help out a two-run attack on Rowe in that inning. His hit was so clean that no play was made on him at third base. Nevertheless he went into a slide. Third Baseman MARVIN OWEN of Detroit, also without apparent justification, blocked off the base.

In blocking off the base, Owen had one foot up. Medwick slid into the spikes. It probably was accidental, but the fact remains that Medwick was spiked first. Thinking he had been intentionally slashed, Medwick kicked back as he lay on the ground. The players were separated, and the game went on.

When Medwick returned to his position in right field in the Tigers' half of the sixth, St. Louis had a seven-run lead on Detroit. Foiled, chagrined, and sorely disappointed, the fans in the \$1.10 bleacher seats had to vent their rage and frustration on something or somebody. Here came Medwick right out in front of them. They had seen him kick at one of their own players. So Medwick became the goat—the visible, and handy, personification of their lost game continued.

Three times the fans showered Medwick with pop bottles, oranges, and lemons. Three times the field was cleared off. Finally Medwick was banished from the game by Judge KENESAW MOUNTAIN LANDIS, and play was resumed. Two fruit stands near the park sold out their entire stocks in a relatively few minutes.

Best Plays

Most remarkable play of the series was perpetrated by Outfielder "JO-JO" WHITE (his real first name is JOYNER, which is almost as bad) of the Tigers, who scored a run in the third game without a single hit being made during the inning.

"Jo-Jo" went to first base on a walk. He stole second, and in sliding into that base he contrived to upset Second Baseman Frisch, so that Catcher BILL DE LANCEY's throw to Frisch went out into center field. White got up and went on to third base on the overthrow. Next he stole home. De Lancey had the ball before White got there, but Jo-Jo neatly kicked the ball out of his hands as he slid into the plate!

White repeated this ball-kicking trick time after time. When sliding into a base he kept his feet pulled under, and then just as he reached the bag he would kick out suddenly with both legs. He had the Cards completely baffled.

In the fifth game Jo-Jo saved the day for the Tigers by making the most scintillating running catch of

the series—a terrific drive off the bat of the dangerous "PEPPER" MARTIN, which White snared out of the glare of the sun after a 90-yard sprint and a desperate lunge. It prevented an almost certain two runs and the loss of the ball game.

White gets our nomination for Detroit's Series Hero—his spectacular feats entitling him to ranking almost equal to that of the incredible Deans.

World's Record

Every hit made by the Cardinal manager, FRANKIE FRISCH, established a new all-time record for hits in World Series games. He already held the record—40—when he entered the fray. It was his eighth World Series.

BILL HALLAHAN, Cardinal pitcher, has participated in four World Series—and all of them in a St. Louis uniform.

Nothing on Johnson

GEORGE B. BRIGHT, one of the most famous engineers in the refrigeration industry, was an interested onlooker; but refused to get steamed up over the personal appearance in the series, as rivals, of the two pitching phenomenons of the year: "SCHOOLBOY" ROWE of the Tigers and "DIZZY" DEAN of the Cardinals.

"They're exceptional young pitchers," admits George, "but I can't see that either of them have anything on WALTER JOHNSON."

Other Nice People

SYD CASWELL, Michigan distributor of General Electric home appliances, and chairman of the Detroit council of refrigeration distributors, was right in there pitching every day from a first-class box seat.

"That second game," avers Syd, waving an arm in emphasis, "was the best blankety-blank baseball game I ever saw. It was something to give you the jitters."

The thing that seemed especially remarkable to me about the series, from the standpoint of the audience itself, was the way Detroit society turned out for the games. Society doesn't generally attend baseball contests around here.

"I sat immediately behind Senator JAMES COUZENS and his son, Mayor FRANK COUZENS."

Syd also grinningly observes that he found himself surrounded by other nice people beside and besides himself!

Other men from the refrigeration industry who took days off to watch the series included:

Frigidaire Sales Corp.: Manager R. Callaway.

Westinghouse Electric Supply Corp.: J. H. Campbell, R. T. Stewart, William Howlett, Charles Perry, Don Beteau, and S. J. McCarthy.

Universal Cooler Corp.: S. J. Gleason, assistant to the president.

Winslow, Baker & Meyering: Mr. and Mrs. D. E. Winslow, F. B. McKay, and P. J. Heder.

Radio Distributing Corp.: C. A. Maurer and G. N. Tobias.

Air Conditioning Corp.: M. Nagel, Jr., vice president and general manager; C. H. Goetz, sales manager; and M. C. Burnside.

American Blower: J. McRobbien, purchasing agent, and H. Ebel, assistant treasurer.

Detroit Lubricator: S. F. Francis Branson, credit department; J. W. Bayley, assistant treasurer; C. H. Hodges, Jr., vice president; J. B. Duffield, vice president; and L. Smuder, traffic manager.

Domestic Air Conditioning Corp.: A. M. Koldstad and S. E. Ritzenheim.

Kelvinator branch: R. W. Walsh, branch manager; R. A. Day, assistant branch manager; R. T. Perkins, wholesale manager; H. F. Eidl, sales manager; R. E. McDowell, office manager and comptroller; and S. E. Stumpf, architectural and institutional department; J. L. Taylor, wholesale department; and A. Wilber, wholesale department.

Maxon, Inc.: L. R. Maxon, C. J. Baker, R. A. Brown, Sid Egan, Searle Hendee, W. D. Laurie, R. A. McInnis, G. R. McKiel, Mike Mahoney, J. A. Mark, I. O'Neil, S. W. Overesch, H. T. Rowe, H. G. Selby, and H. C. Sherk.

Penn Electric Switch: M. E. Hennings, vice president, and Paul Penn, himself.

Specialties Distributing Co.: First game—Geo. Dean, B. V. Cousineau, Bob Turnbull, and Leonard Turnbull. Second game—J. R. Walsh, Geo. Dean, E. Newhall, Jr., Leonard Turnbull, and William Turnbull.

Stewart-Warner branch: T. B. Anderson, A. F. Engel, and S. P. Sargent.

Kelvinator distributors who came to Detroit to see the games included: Myron Garlock, Garlock Co., Lansing, Mich.; L. A. Pixley, Columbus, Ohio; G. B. Barnett, Empire Dist. Elec. Co., Joplin, Mo.; Roy Swann, Isaac Walker Hardware Co., Peoria, Ill.; and John S. Pearson, Indianapolis.

Factory officials who were to be found at Navin Field were: H. G. Perkins, vice president; G. V. Egan, assistant treasurer; R. I. Petrie, domestic sales manager; G. A. Wilcock, "Cold Facts" editor; V. C. Woodcox, advertising director; Walter Jeffrey, sales promotional department; Hayden Hill, advertising department; W. M. DeWitt, advertising department; F. A. Morrison, director of industrial relations; W. E. Saylor, sales promotion department; S. V. Allitmont, liquid cooling division; E. A. Seibert, service manager; V. J. McIntyre, department store division; Wm. Carah, advertising department; Ed Layport, commercial sales; Harold Priest, assistant manager, national direct sales; Truman Steinko, publicity; O. E. Eastman, sales promotion; A. H. Reinach, commercial sales; J. A. Harlan, commercial sales manager; W. M. Turner, Don Carter, Frank Breaux, Ned Gould, and Jack Collins, all of the order department.

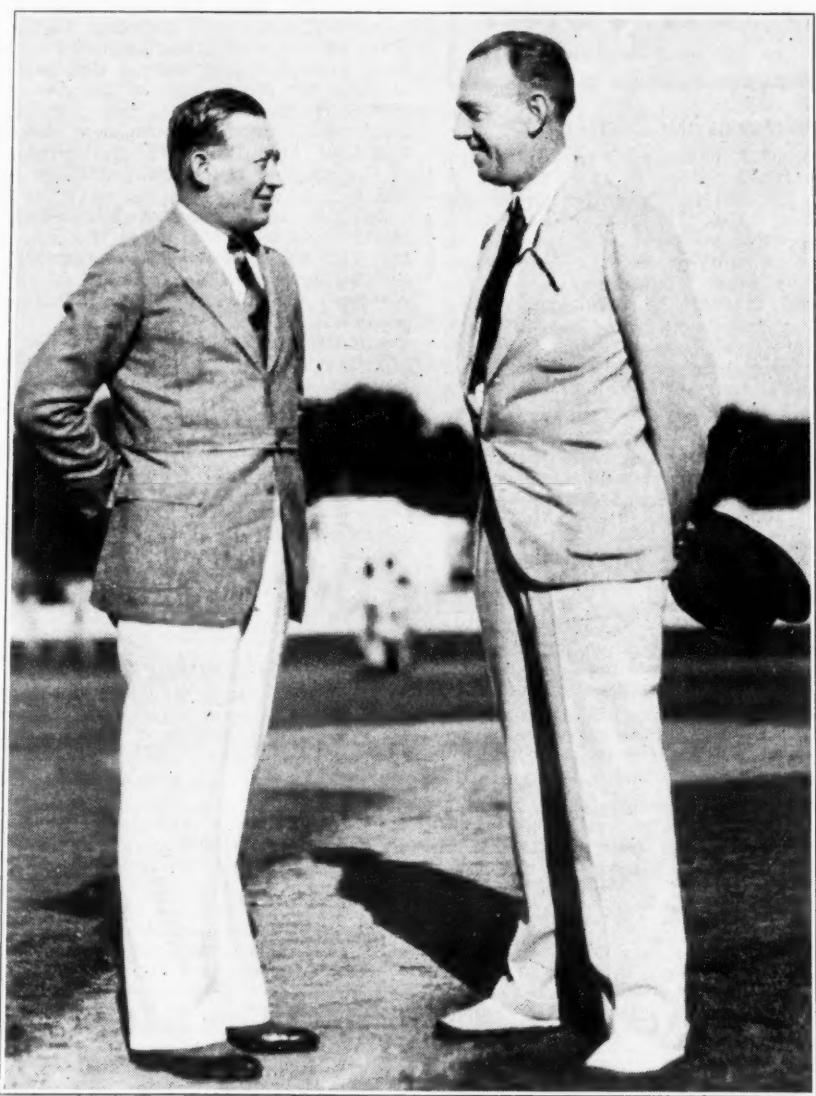
J. C. Berry, Electric Range & Equipment Co., Toledo, was the lone Leonard distributor there. He was accompanied to the games by Paul Sowell, sales promotion department; "Jimmy" O'Neil, department store division; R. R. Ludington, assistant sales manager; "Dick" Nelson, sales department; H. H. Dobbertine, advertising department; and S. C. Mitchell, advertising manager.

Novel Air-Conditioning

Active "SANDY" PRATT, who sells refrigeration supplies out on the Pacific Coast, has sent the News a clipping from the *Pacific Coast Wall Street Journal* which should amuse you no end. Here 'tis:

Refrigerator people were interested in some litigation started in Dallas growing out of the recent high temperatures there. It appears many apartment houses in the city include gas charges in their rentals. Tenants having gas refrigerators shut their

Mr. Crosley Visits Detroit



Powel Crosley, Jr., president (right), and Larry McPhail, general manager, of the Cincinnati Reds appear not in the least down-hearted over the showing their cellarites made during the 1934 season as they appear early at Navin Field for the first game of the World Series. Crosley and McPhail are expected to inject plenty of new blood into the Redlegs before opening day next spring. Nationally known sportsman and industrialist, Powel Crosley, Jr., is founder and president of the Crosley Radio Corp., manufacturer of Crosley radios and refrigerators.

doors and windows and left the refrigerator doors open, thus getting some free relief, which, of course, turned out to be quite expensive for the landlords. The latter are suing to force tenants to keep their refrigerators closed. This certainly leads up to the thought that householders as well as office and factory workers throughout the country are getting more and more air-cooled minded and it is obvious that it is only a question of time and "right" prices when summers will lose much of their discomfort for thousands of Americans.

Tale of Three Cities and Two Beds

Hitting a man when he is down may be outside the ethical code of L. F. WILLIAMS and LESTER YERETZKY of the Alabama Power Co., but hereafter they will not pass up a sales prospect who happens to be flat on his back.

Williams, local manager at Linden, Ala., and Yeretzky, sales supervisor from Demopolis, Ala., recently paid a night call to a refrigerator prospect, only to find that he had gone to bed.

Encouraged by the recollection of two Kelvinator sales made earlier in the evening, the men refused to be

disturbed by the wife's air of finality. At last she was induced to lead them to her husband's sleeping quarters, with the result that a Kelvinator was sold to C. E. PHILLIPS of Thomaston, Ala., without his ever getting out of bed.

Watch for Rex Cole

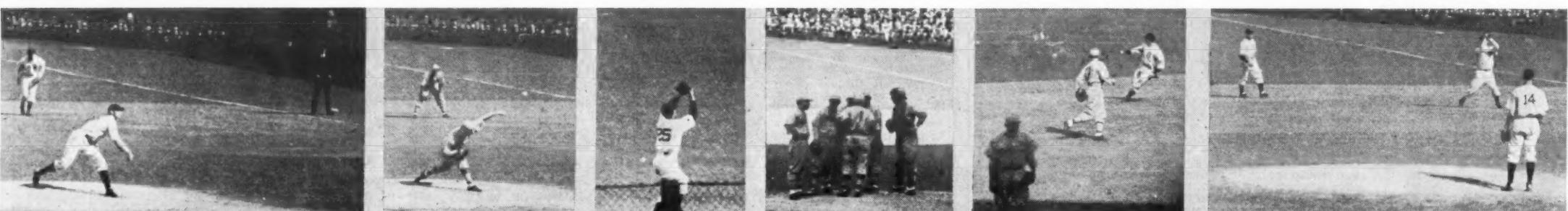
Not so long ago popular Author FAITH BALDWIN used REX COLE, General Electric distributor in New York City, as the hero in one of her novels fictionizing the young-woman-in-business and her problems. It ran serially in *Cosmopolitan*, and probably will appear as a movie soon.

Now, we hear, our friend ARNOLD GINGRICH, editor of the over-night successful *Esquire*, the Magazine for Men, has commissioned CARLETON SMITH to write an article on Rex for that periodical.

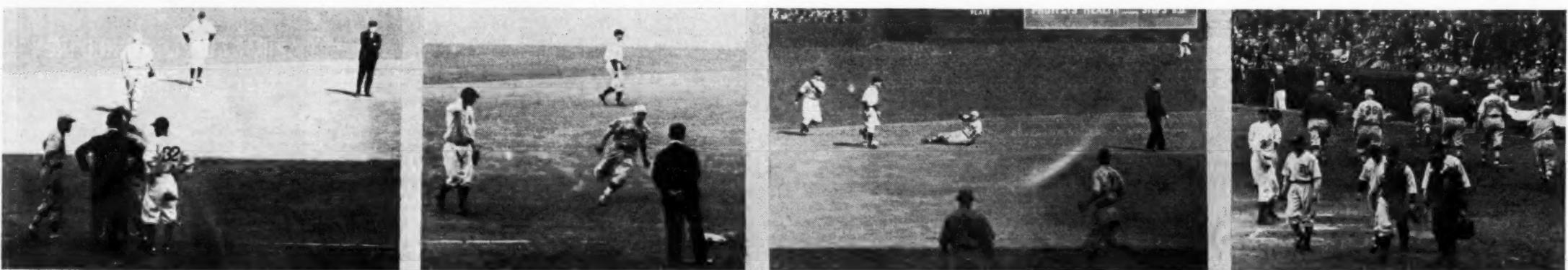
Just what Mr. Smith, who happens to be a Chicago music critic, knows about one of the nation's biggest electric refrigerator distributors we can't guess; but then Rex is unpredictable, anyway. Perhaps he is a virtuoso of the zither, or perchance, the B-flat ocarina.

Anyway, watch the newsstands.

Crucial Plays in the 1934 World Series Baseball Games as Seen from the Stands



(1) "Schoolboy" Rowe pitching. (2) Hallahan lets loose a high floater. (3) Jo-Jo White stops a long fly. (4) A Cardinal huddle. (5) Cochrane touches second. (6) Greenberg checks a line drive.



(1) Medwick and Owen parted after squabble at third base. (2) Martin rounds third. (3) Frisch slides into second. (4) Cochrane returns to the game after an injury.

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DETROIT, MICHIGAN, OCTOBER 24, 1934

Entered as second-class
matter At. 1, 1927OCT 26 1934
THREE DOLLARS PER YEAR
TEN CENTS PER COPY**FHA Says Loan
Firms to Decide
What's 'Built In'**
**Finance Agency Must Pass
On 'Built In' Clause
On Appliances**

WASHINGTON, D. C.—Rulings as to when electrical appliances may be considered as being "built-in" and therefore eligible for financing under the government-sponsored Better Housing Program will be, in general, left to the discretion of the lending institution, it was declared last week by Roger Steffan, director of modernization credits, Federal Housing Administration. No rigid rules on the matter have been laid down by the FHA, he said.

Mr. Steffan's statement was made in answer to an inquiry directed to him by ELECTRIC REFRIGERATION NEWS.

Where the equipment is merely plugged into a current outlet, it cannot be considered "built-in," Mr. Steffan stated.

Radio receiving sets and electric fans are considered purely as personal property and are not eligible for modernization loans, according to this FHA official.

**Roosevelt to Inspect
TVA Project in Nov.**

WASHINGTON, D. C.—President Roosevelt is planning to inspect the Tennessee Valley Authority development next month, according to an announcement made Oct. 18 at the White House.

According to present plans, the President will leave Washington on Nov. 15 for Nashville, visiting Knoxville and Sheffield, Ala., enroute to Warm Springs, Ga., where he will spend Thanksgiving. He is scheduled to arrive in Warm Springs on Nov. 18.

**72,000 View Exhibits
In San Diego**

SAN DIEGO, Calif.—Seventy-two thousand people as against 51,000 last year attended the Second Annual Electrical Exposition held here recently under the auspices of the Bureau of Radio and Electrical Appliances of San Diego County.

Every refrigerator, every radio and practically every other appliance sold in the San Diego territory were represented at the exposition. General Electric Co. and Westinghouse Electric & Mfg. Co. sponsored exhibits featuring lighting.

Other exhibits displayed model kitchens, home workshop appliances, lighting fixtures, therapeutical equipment, lighted house numbers and signs, freezer case stocked with meats, motor and motor winding, ideal wiring displays, etc.

Non-commercial features included the San Diego State College exhibit and the sending station of the Radio Amateurs Association. The last named organization, under the direction of James Delacour and Bernard Baird and volunteer operators, sent messages free of charge. Among the 2,000 blanks filed and sent were messages to Hawaii, Philippines, Cuba, Haiti, Canal Zone, Alaska, Aleutian Islands, China and to the Byrd Expedition at the South Pole.

With the help of the Ryan Aeronautical School and Radio Station KFSD, the National Guard sponsored the opening demonstration, which featured a plane picked out of the night by eight billion candle power lights.

Short wave broadcast from the plane was rebroadcast by KFSD.

**TVA Will Experiment
With Stainless Steel**

MEMPHIS, Tenn.—Tennessee Valley Authority is making plans to enlarge the scope of its experiments through the establishment of operations for stainless steel manufacture and the development of ceramics, David E. Lilienthal, Tennessee Valley Authority director, declared in a recent speech before the Shelby County Young Men's Democratic Club.

WARNING

Electric Refrigeration News has again received information that a man falsely representing himself as an agent of this publication has been calling on distributors and dealers, soliciting subscriptions, and accepting money for these subscriptions without authorization.

A member of the trade in Peoria, Ill., reports that a man using the name of Roger Hooker, and fraudulently representing himself to be working for the Trade Press Bureau of Kansas City, Mo., took money for three subscriptions while in his office. The Trade Press Bureau does not

solicit subscriptions for Electric Refrigeration News, and disclaims any knowledge of the man who goes by the name of Roger Hooker.

Readers of the News are asked to be on the watch for this man, and to report his activities to local police authorities. Electric Refrigeration News has sent no subscription agents into the field, all subscriptions being secured by mail.

Names of all staff members who may be encountered in the field are listed on the masthead of the paper, which is to be found on the editorial page.

Committee Head

HARRY TROUTWINE
Manager of Kelvinator's Boston branch is chairman of refrigeration committee of Boston League.

**Troutwine Chairman
Of Boston Group**

BOSTON—Harry Troutwine, manager of Kelvinator Sales Corp.'s branch here, has been made chairman of the refrigeration committee of the Metropolitan Electric League of Boston, which is sponsored by the Boston Edison Co. This committee will endeavor to establish standardized sales policies and fair trade practices.

Mr. Troutwine has been associated with Kelvinator Corp. for 10 years—four years as a field man and six as manager of the firm's Boston branch.

**NRA Approves Authority
For Counter Freezer Code**

WASHINGTON, D. C.—National Recovery Administration last week announced recognition of the Code Authority for the counter-type ice cream freezer industry.

Members of the Code Authority include D. W. Donohue, Miller Novelty Co.; G. B. Tuthill, Tuthill Pump Co.; J. J. Tyndall, Taylor Freezer Corp.

**Question of State Tax on TVA Is Aired
At Utility Commission Hearing**

NASHVILLE, Tenn.—Is the Tennessee Valley Authority superior to State regulation and taxing power? And if so, how will this affect its validity as a yardstick for electric power rates? These issues were raised in the past week at a hearing here before the Tennessee Public Utility Commission.

David E. Lilienthal, TVA director, asserted that under the Constitution of the U. S., the TVA could not submit to the State's jurisdiction, and that it would not pay State and local taxes. Mr. Lilienthal promised that TVA would pay to the State an equivalent amount in lieu of taxes as a matter of policy.

The hearing here was held to consider application of the Tennessee Public Service Co. to sell its properties at Knoxville, Tenn., to the TVA. Certain of the company's stockholders and a number of ice dealers opposed the application.

**Warren Heads Firm
Selling Chrysler Air
Coolers to Shows**

NEW YORK CITY—Chrysler air-conditioning equipment for theaters will be sold, distributed, and installed in the United States by the newly-formed Control Corp. of America, headed by F. B. Warren.

Entry into the air-conditioning field was announced (ELECTRIC REFRIGERATION NEWS, July 18) by the motor manufacturer whose son, Walter P. Chrysler, Jr., as president heads Airtemp, Inc., which will itself handle all sales, under the sales management of H. C. Jamerson, except in the theater classification granted to Mr. Warren's company.

For the manufacture of the equipment itself, in all fields of air conditioning, there is the Chrysler-owned Amplex Corp. with a plant in Detroit.

Readiness to make immediate surveys and installations in theaters is confirmed by Mr. Warren with the statement that equipment is available for delivery, and that the executive operating staff of the Control Corp. has been named.

The head of the engineering staff will be Andre Merle, and all engineering and air-conditioning equipment problems will be under his direction.

Mr. Merle's experience in air conditioning dates from his discharge from the military service in 1922. He served in the regular army with the First Division Engineers and with the French Colonial Army during the World War. He is said to have had experience in all phases of air conditioning; industrial, commercial and transportation, theaters, department stores, banks.

While with the Carrier Engineering Corp. he worked on the design and erection of installations such as the Chrysler and Lincoln buildings, New York, and the J. L. Hudson department store, Detroit.

For the last three years he has been connected with Clyde R. Place, consulting engineer in air conditioning, and for Mr. Place has worked on the Rockefeller Center development including stores and theaters, and on the design of the new Government Archives building in Washington, D. C.

William E. Harkness will be the traffic and contracting consultant. Mr. Harkness for 30 years was with the (Concluded on Page 9, Column 5)

Mr. Lilienthal explained at the hearing that it was the intention of the TVA to make its power projects real yardsticks for determining a "fair cost" of electricity. This involves plans to provide out of revenues, payments corresponding to taxes, debt retirement, and other charges which a private company would have to meet.

Validity of the TVA "power yardstick" has been attacked on the ground that its costs will not include such taxes as private companies are obliged to pay. This point is made by the National Coal Association in a recently prepared booklet.

Objection is also made in this booklet to the alleged fact that the TVA is not under the necessity of retiring the cost of its projects, these being left for the taxpayer to underwrite.

TVA's reply consists of two parts, (Concluded on Page 9, Column 2)

**LIBRARY
Manufacturers Discuss Code
Provisions at Nema Meeting****Re-elected**

G. M. JOHNSTON
President of Universal Cooler Corp., Detroit, was re-elected chairman of Refrigeration Division of National Electrical Manufacturers Association (Nema) at convention in Chicago. See story in column five.

**Detroit A.S.R.E. Will
Visit Brewery**

DETROIT—Opening meeting of the Detroit A.S.R.E. this season will be an inspection trip through the new plant of the Goebel Brewing Co. at Rivard and Maple Sts. here next Monday night, Oct. 29.

The trip will be in charge of George B. Bright, president of the Detroit Ice Machine Co. which installed Goebel's refrigeration equipment. The meeting will start at 7:30 p. m., and after the inspection trip, lunch and refreshments will be served.

The November meeting of the society, Nov. 12, will be addressed by Prof. A. D. Moore, professor of electrical engineering at the University of Michigan, Ann Arbor. Prof. Moore will speak on a new method of measuring the temperature gradient.

**Denies Stewart-Warner
Dropping Refrigeration**

CHICAGO—Stewart-Warner Corp. of this city is now preparing for 1934 refrigerator production, it was stated Oct. 22 by Joseph E. Otis, Jr., president. Some of the company's distributors were in conference at the factory last week, planning a sales campaign for the current radio season and discussing next year's refrigeration program.

This statement was made by Mr. Otis in answer to rumors that his company has contemplated withdrawal from the refrigeration and radio fields. Personnel in these departments recently has been substantially reduced, due to the fact that most of the experimental and development work conducted over the last several years has been completed.

Distribution facilities have been expanded to such a degree that sales problems on both the radio and refrigerator lines have been minimized, he said. The company is entering the radio season with a complete line, and plans to introduce a new line of refrigerators for 1935.

**Kelvinator Distributor
Opens New Store**

BURLINGTON, Wis.—Partee Electric Co., formerly Burlington Kelvinator Co., has moved to a new location at 638 Pine St., in the heart of the downtown district here, according to Leonard R. Partee.

The company handles Kelvinator refrigerators, Grunow radios, Williams Oil-O-Matic oil burners, Thor washing machines, and Telechron clocks.

Service parts for all makes of electric refrigerators will also be handled.

**Advertising Subsidy
To Outlets May Lead
To Violation of Code
Nema Division to Continue
Fight Against Federal
Excise Tax**

CHICAGO—That electric refrigeration manufacturers who directly or indirectly grant advertising allowances to distributors, dealers, or department stores are liable for untruthful or misleading advertising by those outlets under the industry's code was brought out at the annual meeting of the Refrigeration Division of National Electrical Manufacturers Association Oct. 18 at the Palmer House here.

The code prohibits untruthful or misleading advertising by the manufacturer, and the Code Authority has ruled that the provision applies to any advertising which is partially paid for by the factory.

According to Haldeman Finnie, manager of the Refrigeration Division of Nema, many of the alleged violations of the code's advertising provisions arose as a result of copy prepared by department stores without manufacturers' knowledge. Such complaints have almost entirely disappeared since it has become generally known that a factory will not contribute toward the expense of advertising which violates the manufacturers' code.

G. M. Johnston, president of Universal Cooler Corp., was re-elected chairman of the division for the coming year, and his appointment of W. F. Armstrong of Frigidaire Corp. and Howard E. Blood of Norge Corp. to succeed themselves for a two-year term on the advisory committee was confirmed by the members.

**Mason Elected Member of
Nema Executive Group**

CHICAGO—George W. Mason, president and board chairman of Kelvinator Corp., was elected to membership on the executive committee of National Electrical Manufacturers Association at its annual meeting here last week.

At the meeting, it was resolved to continue the fight to eliminate the manufacturers' excise tax on household refrigerators. It is the group's contention that mechanical refrigerators are no longer a luxury, and that the present and future market lies among families of moderate means.

Executives took the position that the industry is being discriminated against when it is forced to bear a tax burden not applied to other household appliances such as washing machines, vacuum cleaners, etc.

Opinion was also expressed that the federal government is inconsistent in that it aggressively promotes the sale of electric refrigerators among families of moderate income in the (Concluded on Page 2, Column 5)

**Servel Distributor in
New York Moves**

NEW YORK CITY—Majestic Refrigerator Corp., formerly at 534 West 58th St. here, distributor of Servel commercial electric refrigeration in Brooklyn and Queens, is now located at 333 West 52nd St. General offices of the firm are located also in this building, with service and installation departments located in the same building.

Majestic Refrigerator Corp. has operated as distributor of Servel commercial refrigeration equipment in Brooklyn and Queens for the past four years. Murray Bergman is general manager of the concern, and Samuel Lee is general sales manager. Hyman Mufson has recently been appointed sales manager of the Queens division.

John Libbin, former sales manager of the local Wurlitzer Co., has recently joined the organization in charge of sales of the beer and beverage division. Louis Coleman is service and installation manager.

Accountant Presents Factors in Analysis Of Promotion Costs

EAST PITTSBURGH, Pa. — "Cost accountants can render an immense service to their companies and to the value of sales promotional efforts by helping their advertising departments establish some basis of analyzing cost in relation to results obtained," stated Roscoe Seybold, comptroller, Westinghouse Electric & Mfg. Co., in a recent survey of current sales promotional effort.

Sales promotional effort today, according to Seybold, is being more and more limited to promoting the sale of merchandise to those territories and among those prospects which produce the greatest results in sales.

Illustrating this view Mr. Seybold said:

"Take air conditioning as an example. While air conditioning in some form or another has been available for a number of years, it is only quite recently that the manufacturers of air-conditioning equipment have begun an urgent drive for business in this field. It must be remembered that an air-conditioning installation for a single office, for a home, or for a commercial or industrial plant represents a considerable investment."

"When it was decided that Westinghouse would go into this field actively, the very first question that came up was in regard to the size and location of the market. To answer that question necessitated a thorough market study of the sales possibilities.

"The study indicated beyond question that, for the time being at least, the market for air-conditioning equipment is largely commercial; comprising offices, stores, restaurants and other business concerns. Naturally, there is a market for a few residence installations, but these represent a segment of the present market too small to be accorded much of the sales promotion budget.

"It is entirely possible through the use of printed advertising and radio to spread the story of air conditioning to some 25 or 30 million people. If the job is well done, a sufficient number of inquiries about air-conditioning equipment and cost per inquiry to as low as 8 or 9 cents each. On the face of it, this would appear to be a tremendously profitable promotional campaign. But, as a matter of fact, the exact opposite would be true, because almost all the inquiries received would be useless from a sales point of view since they would come from people financially unable to purchase the merchandise.

"The manufacturer, by limiting his appeal to that one-tenth of one per cent of actual prospects and spending considerably more for each inquiry received, would intensify his promotional effort and be far better off. Furthermore, in this particular case and in many similar ones, part, at least, of the additional 'cost per inquiry' is balanced by a lower sales department cost of handling inquiries."

Boston Apartment Gets G-E Refrigerators

BOSTON—Forty-one kitchens in a Boston apartment at 97 St. Stephen St., operated by the Boston Management Co., were recently equipped with General Electric Companion ranges, and model X-5B refrigerators.

Ranges and refrigerators are wired to a central meter, giving tenants free current for cooking and refrigeration.

Kenneth Knott of the apartment house division of W. L. Thompson, Inc., G-E distributor, obtained the order. Installation was made by the Thompson company.

Ayres Wins North Platte District Sales Contest

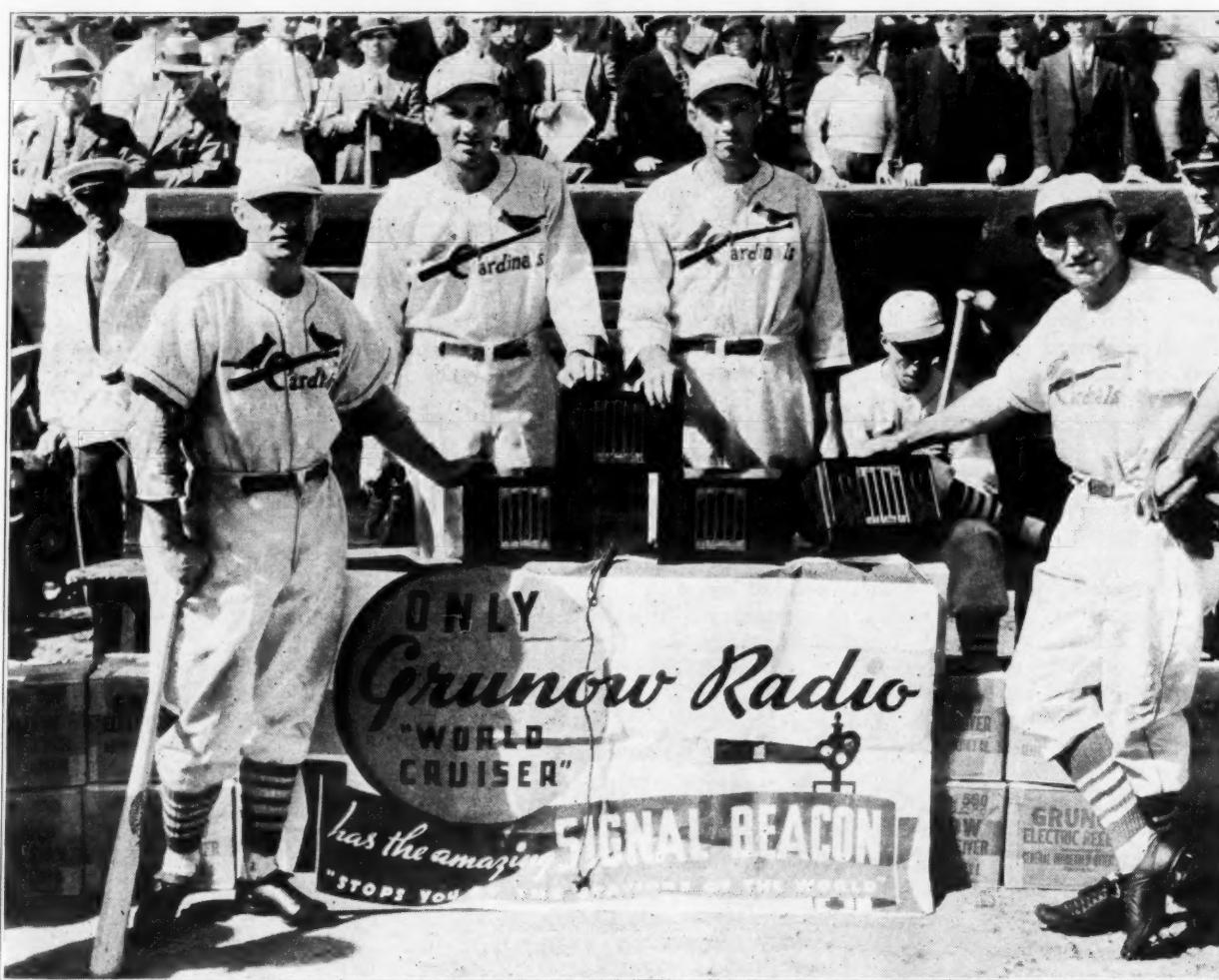
NORTH PLATTE, Neb.—Homer R. Ayres of the Higbee-Keyes Co., local Westinghouse refrigerator dealer, took first place in a midsummer sales contest sponsored by the Northwestern Public Service Co. in the North Platte sales district.

Mr. Ayres won by selling 27 refrigerators in 22 days. He also won second place in the territorial division contest, taking in western Nebraska and North and South Dakota territories served by the company.

Number of Stockholders In G-E Set Record

SCHEECTADY, N. Y.—Number of stockholders of the General Electric Co. at the end of the third quarter, Sept. 30, 1934, was 194,793, a new record in the company's history. This is a gain of 2,868 in the last three months, and more than 6,000 for the year over 1933.

More Trophies for the Champion Cardinals



The famed Dean Brothers, now on a barnstorming trip, keep in touch with news of the world with Grunow portable radios. Players shown above are Frankie Frisch, 'Dizzy' Dean, 'Duffy' Dean, and 'Pepper' Martin. In the rear are members of the staff of Brown Supply Co., St. Louis Grunow distributor.

Standard Statistics Report on Appliances Indicates Larger Volume, Smaller Earnings

NEW YORK CITY—Unit volume of sales on electrical appliances for 1934 will be large, but earnings showings will be less favorable, says a recent issue of *Standard Trade and Securities*, market bulletin published by Standard Statistics Co., Inc.

The bulletin, which deals with household products and supplies, declares that future prospects of all divisions of the household products industry, except ice manufacturing, are decidedly promising. The replacement demand for semi-luxuries accumulated during the depression has as yet been satisfied to only a minor extent, the bulletin points out.

Appliance Sales Up

The report on electrical appliances in general is as follows:

"Improved business activity and increased consumer purchasing power caused a pronounced spurt in demand for electrical appliances in the early months of this year. Sales of electrical refrigerators and washing machines made successive new monthly records, while the output of vacuum cleaners also attained an impressive volume.

"With the summer recession in economic activity, sales dropped off rather sharply. Before the close of the summer, shipments in all lines had fallen below those for corresponding 1933 periods. To a considerable extent, this decline was seasonal, but a weakening of public confidence also was an important factor.

"Sale comparisons during the remainder of the year are likely to be only a little more encouraging. This will not be the case, however, if the seasonal improvement in general industrial activity assumes more significant proportions later in the fall. In any event, unit volumes for the full year will be decidedly reassuring.

"Refrigerator sales for the first seven months exceeded the total for any previous full year interval, while washing machine output for the entire 12 months is virtually certain to establish a new record.

Why Earnings May Fall

"Producers' earnings will be less favorable, largely because increased competition has restricted profit margins. In view of this situation, profits per unit on such products as mechanical refrigerators and vacuum cleaners have been fairly satisfactory. Prices for washing machines, on the other hand, have inadequately reflected expanded costs; hence, incomes of concerns in this field will give little indication of the record sales.

"Since industry codes for these trades provide no strict regulation of prices, the maintenance of remunerative quotations is dependent upon the cooperation of the various trade units. Constructive cooperation, however, is easiest to maintain when consumer demand is sufficient to sustain operations near capacity levels.

"Since the outlook for demand in 1935 is promising, earnings prospects are also favorable and could be rend-

ered more so by further progress toward establishment of a sound and healthy competitive attitude."

Concerning the position of Kelvinator Corp., the bulletin has the following to say:

"Production in the final quarter of the fiscal year ended Sept. 30, 1934, is understood to have been sharply curtailed, pending introduction of new refrigerator models. Retail sales also declined seasonally, but unit volume for the full fiscal year established a new high record.

Kelvinator Earnings Up

"Earnings are believed to have been the best since 1931, and establishment of a regular dividend at a rate equal to or above recent distributions is expected. Although sales will continue to decline in the next few months, the outlook for the current fiscal year is definitely promising. Dealer stocks are unusually low, and the distributing organization has been strengthened.

"Moreover, the management is aggressively pushing sales of oil burners in order to offset the seasonal nature of the refrigerator business. The new division, however, may contribute little or nothing to earnings in the near future because of introductory expenses, but longer term prospects are good.

"Kelvinator is the leading independent manufacturer of electric refrigerators and a close rival of General Motors and General Electric. Products, both household and commercial, are marketed under the Kelvinator and Leonard trade names through more than 5,000 dealer outlets."

Servel Improves

Improvement in the operations of Servel, Inc., is reported by Standard Statistics as follows:

"Sales increased seasonally in the quarter ended July 31, 1934, and prices for Servel's products were held at levels that virtually compensated for additions to production costs.

"As a result, common share earnings for the period amounted to \$0.44, as against a deficit of \$0.02 for the preceding three months and a profit of \$0.34 for the like 1933 period.

"Profits for the nine months ended in July amounted to \$0.32 a share. The normal recession in sales is now in progress, but net income for the fiscal year ending Oct. 31 is estimated at \$0.25 a share, in contrast with a loss of \$0.31 in the preceding 12 months.

"The strong financial position has doubtless been further improved. Prospects for 1935 are favorable, with well maintained prices, more efficient plant operation, and discontinuance of unprofitable items offsetting higher raw material and labor costs. Although it should be possible to pay off dividend accumulations of \$12.21 on the small preferred issue within the next year, common dividends are not a near term probability.

"Servel manufactures Electrolux, the leading gas refrigerator in the

country, as well as a limited line of electric refrigerators, automobile truck bodies, and engine castings. Refrigerators, chiefly gas machines, now account for more than 75 per cent of all sales. Distribution is effected through more than 5,000 utility and dealer outlets."

Holland Furnace Co. is the only firm in the air-conditioning field which is treated, the report being as follows:

"Since sales depend partly upon activity in the residential construction field, which has not improved substantially this year, Holland Furnace operated at a loss of \$112,375 during the three months ended June 30, 1934. This compared with a deficit of \$65,081 in the corresponding 1933 period.

Holland Furnace May Show Profit

"A profit may be shown for the September quarter due to seasonal influences, and the company should derive material benefit from increased construction and modernization of homes under the Housing Act. This is not likely to be an important factor until the middle of 1935, however.

"Financial position is satisfactory, and some payment may be made next year on account of accumulations of \$12.25 a share on the small preferred issue, but common dividends are not in prospect.

"Since incorporation in 1906, Holland Furnace has grown to be the largest manufacturer and distributor of warm-air heating and air-conditioning systems designed mainly for small residences. Accessory lines include a furnace vacuum cleaner, the Holland Thermostat, and a number of minor articles."

Ice Industry Fails to Improve

Standard Statistics reports little improvement for the ice industry, its report stating:

"The peak of seasonal activity for ice manufacturers has passed, and operating trends during the remainder of the year will be downward. While the unusually hot weather early in the summer stimulated demand for ice, and marked improvement in sales to hotels, restaurants, summer resorts, etc., was experienced in many territories, it is doubtful that tonnage sales for the full year will show any material gain over those for 1933.

"The principal obstacle to satisfactory volumes, of course, is the further encroachment of mechanical refrigeration on ice markets. Of perhaps greater significance from a profit standpoint, however, is the severe competition which is restricting profit margins, despite the industry code. While the price rivalry prevails with varying degrees of intensity in different areas, it undoubtedly will prevent any worthwhile recovery in current year earnings."

San Francisco Newspaper Sponsors Electrical Show

SAN FRANCISCO—A home appliance exposition, sponsored by the San Francisco Examiner, was held in the Civic Auditorium here Sept. 25 through 28.

Nema Will Attempt To Obtain Approval Of Standard Ratings

(Concluded from Page 1, Column 5)

Tennessee Valley, while the Treasury Department classes these refrigerators with jewelry, furs, and yachts as subject of a luxury tax.

It was voted to recommend to the American Standards Association for consideration as a standard the method of computing cubic content and shelf area which has been used by Nema members for the past several years. If adopted by A.S.A., this will become standard for all types of mechanical refrigerators.

The group's technical committee reported progress in establishment of a uniform test procedure for mechanical refrigerators. This has been under consideration for some time by Subcommittee 3 of Committee B-38 of the American Standards Association, and it is expected that the work will be completed within the next few weeks.

It was reported at the meeting that since the supplementary code for the electric refrigeration industry became effective in June, complaints of trade practice violations have totaled only 15. Several were found to be groundless, others trivial.

All valid complaints were quickly adjusted by private negotiation with the manufacturers against whom they were made. In practically every case, it was stated, the alleged violations were due to misunderstandings in the early days of the code. Not once has it been necessary to refer a case to the NRA for enforced compliance.

Next meeting of the division will be held in Detroit Dec. 11 when Norge Corp. will act as host.

Those present at the Chicago gathering, which was coincident with the annual meeting of the parent organization, Nema, were as follows:

C. G. Frantz, Apex Electrical Mfg. Co.; Lewis Crosley, Crosley Radio Corp.; T. K. Quinn, P. B. Zimmerman, C. G. Chapman, General Electric Co.; W. F. Armstrong, Frigidaire Corp.; C. J. Gibson, Gibson Electric Refrigerator Corp.; G. W. Mason, H. W. Burritt, V. C. Woodcox, Kelvinator Corp. and Leonard Refrigerator Co.; F. E. Wilson, Merchant & Evans; H. E. Blood and J. H. Knapp, Norge Corp.; Louis Ruthenberg, Service, Inc.; C. R. D'Olive, Stewart-Warner Corp.; W. A. Carson, J. H. Schroeder, Sunbeam Electric Mfg. Co.; G. M. Johnston, Universal Cooler Corp.; P. Y. Danley, R. C. Cosgrove, Westinghouse Electric & Mfg. Co.

Sears, Roebuck Fete Leading Salesmen

CHICAGO—Eighteen salesmen, winners in a refrigerator, washing machine, and stove sales contest, conducted by Sears, Roebuck & Co. among its retail stores, were recently brought here for a three-day outing at A Century of Progress.

The contest opened July 17 and lasted eight weeks, the retail stores being divided into nine major groups, with the two highest-ranking salesmen in each group receiving the trip award. In charge were H. C. Price, national supervisor of the Sears washing machine department, and T. J. Callans, divisional sales manager.

Winning salesmen were:

John L. Wells, Newport News, Va.; M. W. Yearsley, Wilmington, Del.; C. Hance, Jamaica, L. I.; C. A. Fite, Seattle; S. M. Meyers, Milwaukee; G. H. Jeude, Kalamazoo, Mich.; C. H. Heald, Dallas; C. J. Cunningham, Wilmington, N. C.; J. H. Powers, Benton Harbor, Mich.; J. D. Cochran, Akron, Ohio.

E. A. Monitz, Salem, Mass.; William Rollett, Rochester, N. Y.; E. Paquin, New Haven, Conn.; H. C. Price, Pittsburgh; E. R. Langhan, Davenport, Iowa; T. H. Windrum, San Antonio; C. Holton, Cincinnati; R. O. Stratton, Glendale, Calif.

Coal Association Predicts Probable Effects of TVA

WASHINGTON, D. C.—The National Coal Association, which is vigorously opposing the expansion of the TVA power activities, stated in its booklet that the proposed power output of the TVA would have the following effects:

1. Displacement of a market for six million tons of coal each year, this being the amount which would be required to generate by steam the power which the TVA will obtain by its dams.

2. The elimination of 120,000 carloads of revenue freight from the railroads annually, corresponding to the amount of coal displaced.

3. A loss of over 12 million dollars annually in rail revenue, half of which goes to rail labor.

4. The loss of six million dollars each year in wages to mine workers.

5. The closing down of hundreds of mines.

COMMERCIAL REFRIGERATION

Refrigeration Men Give Features of Electric Milk Coolers At Dairy Show

Economies of Electric Milk Coolers for Farms Explained By Timmerman, Marshall, Ambrose and Jamison

CLEVELAND — Advantages and economies of electric refrigeration for milk cooling were presented to the production section of the International Association of Milk Dealers here Tuesday afternoon, Oct. 16, in a symposium on "Best Methods and Equipment for Handling Milk on Farms and in Transit to Safeguard Quality." The meeting was held in the Statler hotel, on the second day of the Dairy Industries Exposition.

Speaking in advancement of the cause of electric refrigeration at the symposium were W. M. Timmerman of General Electric Co., Cleveland; R. D. Marshall of Williams Oil-O-Matic Heating Corp., Bloomington, Ill.; R. B. Ambrose of Frigidaire Corp., Dayton; and Robert R. Jamison of Esco Cabinet Co., West Chester, Pa.

The speakers presented cost studies on electrically refrigerated milk-cooling equipment, explained operation of the common types of milk coolers now in use, and at the end of the session answered a number of questions raised by the milk producers.

Costs of Wet & Dry Coolers Compared By Timmerman

"The Cost of Cooling Milk" was discussed by W. M. Timmerman, commercial engineer for General Electric Co., Cleveland. Mr. Timmerman declared that the economy of using electric refrigeration equipment for the cooling of milk has proven itself in the numerous installations throughout the country, and went on to analyze the costs and to present tables which might serve as a guide for small and average producers of milk.

In arriving at complete costs the following factors were used:

Depreciation—10 per cent per year. Interest on investment—6 per cent per year.

Maintenance.

Operating cost.

The original cost as well as the operating cost of milk-cooling equipment will vary widely, depending on a number of variable factors. Therefore, in comparing costs it is essential that the figures be based on the same conditions," he said.

The principal factors governing the costs, according to Mr. Timmerman, are:

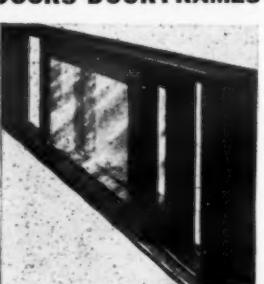
1. The total quantity of milk handled.
2. The total quantity of milk stored.
3. Precooling with well water.
4. The cooling water temperature.
5. Whether or not the milk is pasteurized and bottled.
6. The type of equipment used. (i.e. Immersion coolers, dry storage, etc.)
7. The effectiveness of the insulation used in the storage cabinet.
8. The room temperature.

Types of Cooling Equipment

The various types of milk-cooling equipment commonly used are:

1. Immersion Type
Insulated concrete coolers.

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For commercial display cabinets. Doors...Door Frames...Slide Rails...Jams...Glazing Strips...Trim...Many standard and special sizes and parts...Catalogue and prices on request.

AMERICAN HARD RUBBER COMPANY
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Akron, Ohio—111 West Washington St., Chicago, Ill.

Factory built coolers.

2. Dry-Storage Type

Lift-lid type with brine tank. Walk-in cooler with brine tank.

Walk-in cooler, direct expansion.

"Since most of the small producers use immersion-type coolers, Tables I and II give costs on this type both with and without precooling. Costs are given for milk production of 20, 40, 60, 80, 100, and 120 gallons per day.

"Table III gives costs on the equipment required to handle 500 gallons of milk per day for an installation where the milk is pasteurized, cooled, bottled, and stored in crates for delivery the following day," he said.

Conditions assumed in the preparation of the tables are:

1. All of the equipment including coolers to be factory built.

2. An average yearly ambient temperature of 75° F.

3. Electric rate 4 cents per kWh.

4. Air-cooled refrigerating units for the immersion coolers and a water-cooled unit for the dry-storage cooler.

"The original cost and operating cost figures are not for any particular brand or make of equipment. They are values representative of typical equipment on the market. In all instances the operating cost figures are conservative," he claimed.

In Table II the original cost of the circulating pump and aerator are not included nor is the cost of the precooling water included in the operating cost.

In Table III the aerator and circulating pump are included in the original cost and the cost of precooling water in the operating cost.

Marshall Tells of Need for Proper Refrigeration

R. D. Marshall of Williams Oil-O-Matic Heating Corp. spoke on the subject "Mechanical Refrigeration and Its Relation to Producers and Distributors Profits."

"Viewed from one angle, there are certain aspects of your business that are comparable to other forms of commercial activities. You have the general business problems always associated with supply of material, manufacturing or processing, and sales and distribution," he said in introducing his subject.

"Aside from those common concerns, your business is one peculiar unto itself. None of the material used by you is produced in your processing plant. You cannot add other products to your line to increase your revenue, as can other manufacturing or processing companies.

"Your revenue can be only increased by improving the nutritive value, the taste, appearance and keeping quality of the one commodity you are equipped to handle—dairy products.

"Processing equipment can materially aid in accomplishing these objectives, but processing alone cannot do it. The raw material used in processing must be right. Its quality must be improved. Higher standards must be set up and maintained," he remarked.

"In your business, as in all others, competition is keen. There was a time when, in the minds of the general public, milk was just milk. Now, due to study and research, the difference between clean, safe milk and 'just milk' is appreciated by the big majority of people everywhere; and quality can demand a premium.

"Nature's intended method of conveying milk from the producer to the consumer was direct, by means of the mouth-to-teat process. Used in that way, milk is usually a safe food, but when miles of distance and hours of time are between the producer and consumer, means of preventing contamination must be used," he pointed out.

"Your public recognizes this fact and demand, and are willing to pay for, whatever safeguards are necessary.

"To furnish the product that your public wants, it is necessary to improve the quality of the milk as you get it.

"Municipal health authorities, know-

Cost Using Immersion Type

TABLE I—IMMERSION TYPE MILK COOLERS

Conditions: Milk cooled (95° F. to 40° F.) and stored. No precooling. 75° ambient. Air-cooled condensing units. 3 in. insulation in cabinets. Depreciation on 10-year basis. Interest on investment at 6 per cent per year. Electric rate—4 cents per kWh.

No. Gal. Per Day	Yearly Operating Cost and Fixed Charges			Approximate Cost Per 100 Lbs. of Milk	
	Original Cost	Kwh. Per Day	Interest on Investment		
20	\$265.00	3.0	\$42.50	\$10.00	\$96.50
40	375.00	4.8	60.00	15.00	145.00
60	415.00	6.3	66.50	20.00	178.50
80	500.00	7.6	80.00	20.00	211.00
100	550.00	8.7	88.00	25.00	240.00
120	600.00	10.0	96.00	25.00	267.00

TABLE II—IMMERSION TYPE MILK COOLERS
(MILK PRECOOLED TO 65° F.)

Conditions: Milk precooled to 65° with well water. 75° ambient. Air-cooled condensing unit. 3 in. insulation in cabinet. Depreciation on 10-year basis. Interest on investment at 6 per cent per year. Electric rate—4 cents per kWh.

No. Gal. Per Day	Yearly Fixed Charges and Operating Costs			Approximate Cost Per 100 Lbs. of Milk		
	Original Cost	Approx. Kwh. Per Day	Interest on Investment			
20	\$265.00	2.0	\$42.50	\$10.00	\$29.00	\$81.50
40	315.00	3.2	50.50	10.00	46.00	106.50
60	350.00	4.2	56.00	15.00	60.50	131.50
80	450.00	5.3	72.00	15.00	76.50	163.50
100	500.00	6.4	80.00	20.00	92.00	192.00
120	550.00	7.2	88.00	25.00	105.00	218.00

*Note: Does not include cost of precooling water.

Dry Storage Type

TABLE III—COOLING COSTS USING DRY TYPE COOLERS

Conditions: 500 gallons milk handled per day. Milk pasteurized, cooled over aerator, bottled and stored in crates for delivery next day.

Milk precooled to 70° F. with well water after pasteurization, and then cooled to 40° F. with brine.

Average room temperature 75° F. Water-cooled condensing unit. 4 in. corkboard insulation in cooler. Depreciation on 10-year basis. Interest on investment 6 per cent per year.

Electric rate—4 cents per kWh.

Costs

1. Original cost of equipment.....\$2,700
Storage cooler.
Refrigerating unit.
Aerator and brine pump.
2. Yearly operating costs and fixed charges:
Depreciation and interest on investment.....\$432
Kwh. consumption.....\$605
Refrigerating unit—40 kwh. per day.
Brine pump—1.5 kwh. per day.
Water consumption.....\$100
Precooler—2,000 gal. per day.
Refrigerating unit—2,000 gal. per day.
Maintenance.....\$40
Total.....\$1,177
3. Approximate cost per 100 lbs. of milk—7½ cents.

ing the ease with which milk could become contaminated, the rapidity of bacterial growth, and the possible effect of such conditions on health, became vitally interested in your business and surrounded it with rules and regulations, one of which had to do with milk temperatures.

"Milk had to be cooled immediately after milking, and had to be kept cold until delivered," he asserted.

Present Methods Reviewed

Methods available on farms to accomplish this (usually cold water, then ice) proved inadequate and costly and mechanical refrigeration was urged as the ideal means for giving proper control of the situation, Mr. Marshall related.

"Again the farmer had to be shown. To him it was an expensive and unnecessary innovation. He had to be shown first, the necessity for it. Health authorities and colleges were assisting you to do that.

"Would it benefit him? Your premiums convinced him of that. Could he afford to purchase the equipment, and was he able to stand its cost of operation and upkeep?

Accurate Survey Made

To get accurate information, a

Wisconsin Farms Modernize



One of the several installations of Frigidaire 'Flowing Cold' milk coolers made on farms in the vicinity of West Bend, Wis.

number of farms were visited, Mr. Marshall said, and actual production and cost figures were obtained as follows:

Average initial cost of electric motor-driven equipment, exclusive of tank.....	\$230.66
Average yearly production.....1,440 cwt.	
Average cost of operation per cwt. (Rate .03 per kWh.).....	.041
Average depreciation and upkeep per cwt. @ 15%.....	.024
Average interest per cwt. @ 6%.....	.009
Total expense per cwt.....	.074

A similar survey covering gasoline engine-driven equipment gave the following figures:

Average initial cost of engine-driven equipment, exclusive of tank.....	\$292.40
Average yearly production.....1,936 cwt.	
Average cost of operation per cwt. (Gasoline @ 17¢ per gallon).....	.055
Average depreciation and upkeep per cwt. @ 15%.....	.046
Average interest per cwt. @ 6%.....	.018
Total expense per cwt.....	.119

"Every farmer visited had succeeded in so improving the quality of milk produced as to enable him to earn a premium of 60 cents per cwt. on all milk and no milk had been rejected for any cause," the speaker declared.

Ambrose Describes 3 Types of Cooling Equipment

Milk Cooling

(Concluded from Page 4, Column 5)
saving in first cost and has the added advantages of taking less room in the milk house and eliminating the inconveniences and difficulties incident to handling large quantities of brine.

"This type of installation requires special aerators built for this kind of service. Frigidaire approves Cherry-Burrell or Terminal Sheet Metal direct expansion aerators," he said.

"Storage for this type of milk cooling is provided in standard coolers or refrigerators by the use of finned coils, and storage refrigeration is usually supplied by the same compressor unit which provides refrigeration for aeration."

Jamison Discusses Milk Coolers for 'Average Users'

Robert R. Jamison, development manager of the Esco Cabinet Co., West Chester, Pa., was another speaker, considering the subject of "Milk Cooling Equipment for the Average Producer."

"When we speak of milk-cooling equipment for the average producer, we usually mean both cooling and storage facilities for the proper handling of his milk," Mr. Jamison said at the start.

"At least one milking must be stored, and in most cases storage capacity should be provided for the maximum quantity of milk produced by his herd in a full day, or 24 hours."

The speaker mentioned the two general classes of milk-cooling equipment, (1) dry storage and (2) wet storage.

He favors the latter method because milk "must be cooled to the desired temperature before it is placed in dry storage, and therefore an aerator must be employed."

"With the average producer, the use of aerators should be discouraged because he is not equipped to care for such equipment properly. For this reason, the average producer in many sections is not permitted to use an aerator, or surface cooler," he said.

"While an aerator may aerate the milk, thereby removing some undesirable odors, the purpose for which it is used is defeated if it is not thoroughly cleansed and sterilized. Many authorities now agree that aeration of milk on the farm is unnecessary," he declared, "and that the right method to avoid undesirable odors in milk is to prevent their entrance by observing proper sanitary measures."

"Whether a dairyman uses ice or mechanical refrigeration the first requisite is an efficiently insulated cabinet or tank of correct size and proportions," he said, and quoted Miscellaneous Publication 138 (U. S. D. A.) with regard to size:

"When the water in the tank is cooled artificially, the initial quantity should be as small as practicable consistent with effective operating conditions, because of the cost or the labor of removing the heat originally contained in it."

"Therefore for reasons of economy and efficiency a tank too large may be as incorrect as one too small."

"When we speak of efficient insulation we mean just that—the material itself must have adequate resistance to the flow of heat, it must be of proper thickness, and it must be protected against the entrance of moisture, either atmospheric or liquid. Insulation of this kind definitely retards loss of refrigeration, called heat leakage, through the walls of the cabinet," Mr. Jamison said.

He then quoted Marquardt and Dahlberg (Bulletin No. 581 of the New York State Agricultural Experiment Station) that three inches of insulation such as cork or its equivalent, protected against moisture, saved more than its cost in refrigeration in one summer. Other authorities agree that three inches of good insulation is required. The refrigeration co-efficient of good insulation is about .30.

He next considered the question: What are the requirements of a mechanically refrigerated milk cooler for the average milk producer?

"A mechanically refrigerated milk cooler," he said, "is made up of three primary parts, namely:

"1. An efficiently insulated and properly constructed cabinet of proper size and proportions.

"2. An accurately engineered cooling coil (with expansion valve) properly mounted on a protecting and supporting rack.

"3. An efficient refrigerating machine operated with electric motor or gasoline engine, the operation of which is thermostatically controlled.

"Each part must be correctly designed for balanced operation with the other parts. This is not a hit-or-miss application, but is a job that requires engineering."

"The cabinet must be of proper

proportions to allow the correct ratio of water to milk. If the volume of water is too small, the temperature rise will be too great when warm milk is placed in the cooler. Too high a temperature rise means slow unsatisfactory cooling and an overload for the refrigeration unit, which will result in unbalanced operation."

"The cabinet must be of correct size to accommodate a certain number of cans of milk, and at the same time so made as to limit its capacity to that number to prevent overloading."

"The cabinet must be properly insulated, and the insulation protected against moisture. The materials from which it is made must be especially selected for resistance to deterioration in the presence of moisture."

"The cooling coil and rack must be especially designed and engineered for the particular size of cooler, and for the size of refrigeration unit. Otherwise, the heat will be picked up too slowly or too quickly. If too slow, the refrigeration unit does not perform as much work per hour of operation as it is capable of. If too quickly the unit will be overloaded."

According to the speaker, the arrangement of the coil is of great importance, and since the greatest amount of heat must be removed from the top of the water bath, the coil must be so placed as to care for this heat load effectively and efficiently.

"The expansion valve should be so placed that the refrigerant passes into the top coil first, and successively through the lower convolutions to be returned to the refrigeration unit from the bottom round," he stated.

In a recent article in *Refrigerating Engineering* on "Farm Milk Cooling Plants," John E. Nicholas, associate in agricultural engineering at the Pennsylvania State College, states, ". . . the connecting of the expansion valve to the bottom or the top coil has a marked influence on the uniformity of the water cooling." Mr. Jamison pointed out.

"With the expansion valve attached to the top coil, Nicholas found that the top layers of water were lower in temperature, that a smaller differential existed between top and bottom layers, and that a much smaller water to milk ratio could be maintained. He also says that some ice on the coils is favorable to rapid and uniform cooling, but thick ice on coils will prevent rapid heat transfer," he said.

The third requirement for a complete milk cooler is the refrigeration unit, in the speaker's opinion. "This must be of proper size or unbalanced operation will result. It is just as unsatisfactory to have a refrigeration machine that is too large as to have one that is too small."

"A unit that is too small will result in an excessively long running time. A unit that is too large will give an unbalanced operation because of frosting back, excessive ice formation, frequent 'shut-down' periods for defrosting, and other factors contributing to the wasteful use of the refrigeration and energy."

The operation of the refrigeration unit should be controlled thermostatically with the temperature of the water bath governing the operation. For balanced automatic operation the thermostatic control should cut the unit out when the water bath reaches 36° F. and cut the unit in when the water bath reaches 39° F.

"Hence, the thermostatic control should operate on a 3° differential, and should be equipped with a large bulb so as to assure positive functioning when air temperatures surrounding the milk cooler are lower than inside temperatures," Jamison said.

Reviewing briefly the operation of a mechanically refrigerated milk cooler, he explained that the motor operates the compressor, which is controlled by a thermostat. The temperature of water in the cooler actuates the thermostat. When the temperature of the water rises to a certain point the thermostat automatically closes the electric circuit.

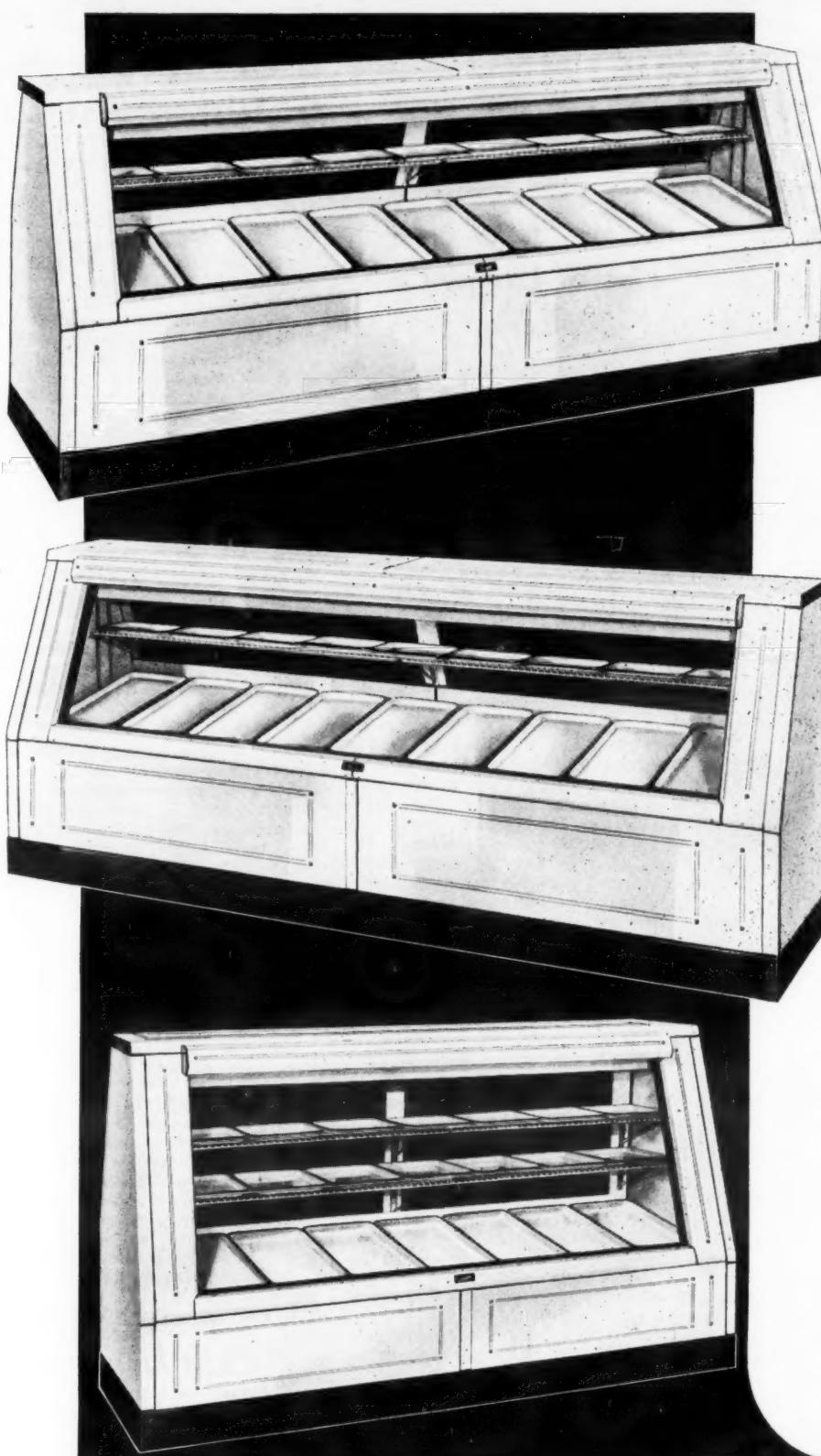
In the cycle of operation, the liquid refrigerant passes through the expansion valve into the cooling coil, cooling the water. The vaporized refrigerant, or gas, continues through the coil and back to the compressor where it is reduced in volume and put under pressure.

The compressed gas passes into the condensing coil where a stream of air (or a counter current of water) removes the excess heat and the heat of condensation so that it again becomes a liquid. When the water is brought down to the right temperature, the thermostatic control breaks the circuit, and stops the machine.

When controlled at proper temperatures, ice on the two top coils will be built up at the end of the operating cycle and will act as a reserve of refrigeration serving a very definite purpose, he explained.

"When cans of warm milk are placed in the cooler, the first flush of heat is absorbed by the ice, which melts, thereby enabling the quick cooling of the milk."

Mr. Jamison claims the system described will cool the milk to below 50° in about 1½ hours without agitating the water bath, and without stirring the milk in the can.



Single Duty Display Case Series One

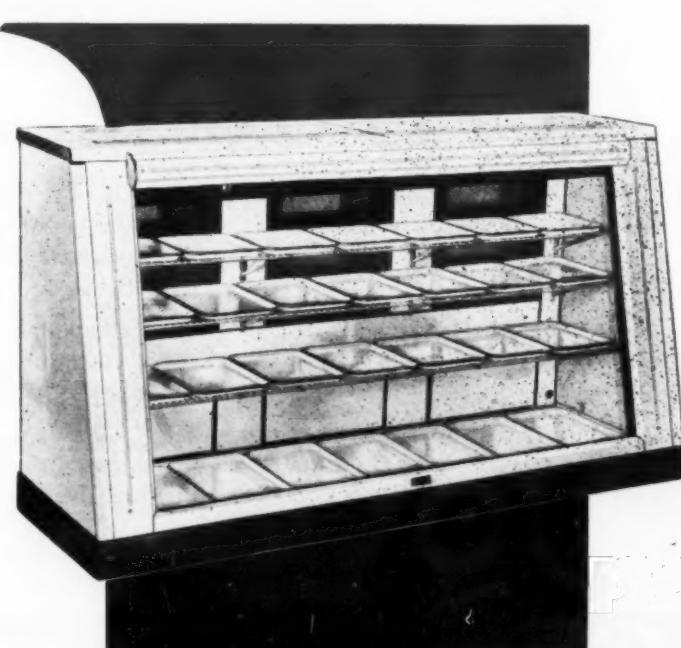
Double Duty Display Case Series Two

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Full Vision Display Case Series Four

TVA COMMENT

Quinn & Lilienthal Give Views On TVA Plan at EH&FA Dinner

G-E Executive Points to Cooperation of Utilities And Manufacturers

By T. K. Quinn,* Vice President
General Electric Co.

Tonight we inaugurate a new activity of the Electric Home & Farm Authority. I count it a rare privilege to be here and thank you for the invitation.

I have followed the development of the Government program in the Tennessee Valley from the beginning sympathetically and with wide open eyes. You know there is such a thing as the independent viewpoint of an American citizen.

I believe that a good job has been done here by the able, socially minded men who have been charged with the responsibility in this great enterprise. I expect to be allowed to say so, without having my statement interpreted to mean that government everywhere is efficient and should replace private industry.

Not a 'Blind Individualist'

I also expect to be allowed to say what I have just said without being regarded as a blind individualist, who automatically favors child labor, watered stock, commercial disease, and Al Capone.

The first time I ever met the principal speaker of the evening (Mr. Lilienthal) I told him a story which seemed to me to describe the spirit of this whole understanding.

The story concerns a little fellow at school who, without asking permission of the teacher, went to the blackboard and proceeded to draw a picture. The surprised teacher inquired, "Johnny, what are you doing?" "Please teacher," he said, "I am drawing a picture of God." "Why Johnny," she replied, "that is very, very naughty, no one knows what God looks like." Johnny answered, courageously, "I know that teacher, but they will when I get this picture done."

You are fortunate here in having a particularly progressive public utility group. The company with the largest investment in the Tennessee Valley States is the Commonwealth and Southern Co. Mr. Wendell Wilke, the chief executive of that company, who is with us tonight, is an unusually able, open-minded and forward-looking man. He has had the spirit to cooperate, whole-heartedly, in every possible way since the passage of the Act creating the Tennessee Valley Authority.

The manufacturers have also worked along cooperatively. When I speak of cooperation, my friends, I mean mutual action resulting in a common good and not cooperation according to the definition of a wise but rather cynical old friend of mine, who once said, "Cooperation is an arrangement whereby you and I get together to do something for me."

Electrical Progress Seems Slow

I was born and raised in the electrical industry, and have a very natural interest in the progress of electrical development. When we consider the benefits, cleanliness, convenience, comfort and economy of electricity, especially in the home, we get impatient over its seemingly slow progress. Nevertheless, the truth is that a wonderful job has been done. Habits and customs change very slowly. I can remember when the great struggle was to attract capital and the things we now take for granted had to be sold. It has been a difficult sales job all through.

Let me cite just two illustrations. In half the wired homes of the country, which means about two thirds of the total number of all homes, women are still breaking their backs over old-fashioned wash tubs.

Take another illustration — electric cookery. I am not going to mention any brand names tonight but no one who has ever cooked food electrically will ever cook it any other way; yet we must advertise and demonstrate and educate and sell eternally. The educational part of our sales cost is the largest single item.

The host of electrical applications increases in number every year. There is a great and promising future for us and for our country in the electrical field.

*The two addresses printed on this page were made at a dinner given recently in Chattanooga by Electric Home and Farm Authority officials to directors of the Tennessee Valley Authority.

EH&FA Head Strikes at Critics & Asks South's 'United Support'

By David E. Lilienthal,* President
Electric Home & Farm Authority

The progress of this country can be traced in our successful efforts to relieve men and women of back-breaking toil and deadening drudgery. America has led the world in making electricity do the hard and disagreeable work which is a part of our industrial age. In the factory this great work has reached a stage which would have seemed impossible only a generation ago.

And now the next great step: To bring the magic power of electricity to the aid of the home and farm. I can think of nothing which we can accomplish in America in the next 25 years which holds greater promise for the enrichment of life.

If the Electric Home & Farm Authority does nothing more than point the way to the electrification of the American home and farm, it will amply justify its creation by the President.

In its few months of existence, the EH&FA has made clear to a large part of the American public certain principles. These principles are, we believe, the guideposts to be followed if we are to reach the goal of the electrification of America's homes and farms within the coming generation.

We have been greatly encouraged to find the wide acceptance and enthusiastic response which has been made not only in the Tennessee Valley but throughout the country to these simple principles. I should like to briefly enumerate them.

The Demand for Electricity

First, the people of the country want more electricity. The 20 million people who have electricity in their homes want to use it more generously and for many more purposes. The 10 million homes which have no electricity at all keenly want the advantage of this giant servant of the average man.

Second, the far wider use of electricity cannot be achieved unless electric rates are drastically reduced. As a corollary, when electric rates are reduced substantially and drastically and not timidly and inadequately, the use of electricity immediately expands. And once people become accustomed to the increased use of electricity, they never return to their earlier customs.

Third, a wide generous use of electricity necessitates reductions in the price of electricity-using appliances. There must be standardization of design along sound lines. There must be standardization of quality on the basis of the usage of the average family, the elimination of meaningless frills and decorations which increase costs and work against standardization.

Fourth, the man of average income must have financing available for electricity-using appliances. Collections should be made by the central stations furnishing the electricity so as to eliminate duplication of collection expense. A rigid standard of credit should be adopted. Consumer credit in this field is a sound policy, we believe, because these appliances are a necessity of life and almost invariably effect a saving in the family budget. Experience has shown that credit losses in this field are so slight as to be negligible where the project has been reasonably well managed.

Urge Gov't. Testing Laboratory

Fifth, the consumers should be protected against inferior electric appliances through the medium of a consumers' laboratory to be operated under government auspices. This laboratory should also conduct research looking toward the improvement of designs and new designs which will make electric appliances best adapted to the needs of the average family. The mark of approval of such an agency may well become sufficiently important that few customers will buy equipment unless it has been approved by such an agency.

It is encouraging to note the progress which has been made in the few months in which this program has been in effect. TVA electricity rates have, we believe, already demonstrated the social wisdom and business soundness of drastic rate reductions. Privately owned utilities in this area and elsewhere have been convinced of the soundness of this view, and

rate reductions by voluntary act of the management have resulted in millions of dollars savings annually to electric consumers.

As to appliances, the manufacturers of electric equipment have joined in this program aggressively and effectively. Substantial agreement has been reached with a large number of manufacturers on specifications of equipment and the standardization of electric ranges, water heaters, and refrigerators.

At the same time, competition as to quality, designs, and price continues as a protection to the consumer and as a stimulant to the aggressive, well-managed manufacturer. Prices to the consumer have been reduced, through the efforts of EH&FA, at first for the Tennessee Valley and more recently for the country as a whole, as much as 35 per cent, at a time of rising material and labor costs.

Refers to 'Trade Paper' Dissenter

While most of the manufacturers and dealers have been genuinely cooperative, there have been some important exceptions. For example, the trade paper of one such dissenting group has poured out a steady flow of comment designed to discredit the Government's efforts. This minority resents our efforts to bring down prices of equipment; they would like a chance to gouge the unorganized buying public.

The fight for the lowest reasonable price for home equipment will go on. The Government's first loyalty is to the mass of men and women—the consumers.

The various Federal agencies concerned with housing the home equipment will never, I am confident, submit to the tactics of this short-sighted minority. No group of manufacturers or dealers has ever yet withheld the pressure of consumer opinion. And the Federal agencies do not believe that this particular minority will be any more successful.

In the matter of consumer financing, great progress has also been made. Here the principles put forward by EH&FA have been put into practice on a broad front by the Commonwealth and Southern Companies, and other privately and publicly owned utilities. Apparently a similar practice will be adopted by private utilities in other sections of the country. It will not be necessary for the Government itself to do the major part of this financing.

Congress Can Make it Permanent

What the future of the EH&FA will be is difficult to determine. It was set up as an emergency agency and will not attain the status of a permanent agency unless Congress so provides. But whether temporary or permanent, we believe that its few months of life have amply justified the President in setting up this agency.

We have reason to believe that when the history of the electrification of America's homes and farms is written, President Roosevelt's creation of the EH&FA will be regarded as one of the landmarks.

No part of the United States can look forward to a more promising future than the Tennessee Valley area. Everywhere you go you find the most intense interest in what is going on in this great section. I found English industrialists and bankers, engineers and economists, and men holding positions of public responsibility, all eager to hear more of this project.

Hydro-electricity—cheap, abundant, and perpetually in public control—is the key to the days of promise which lie immediately ahead for the Southeast. The two are inseparable: The progress of the Southeast, and the wide distribution of electricity produced by the harnessing of the Tennessee River. This pool of power will be a by-product of dams built to protect Chattanooga and other cities from destructive floods, and to make a great highway of the Tennessee River.

Calls Enemies 'Cunning'
We see today on every hand the steady forward march of the Tennessee Valley region. We are confident that nothing can stop this progress. But we are none of us blind to the strength or the cunning of the enemies of the President's plans and hopes for the South.

The South needs every one of its sons and daughters to carry through the greatest opportunity in her history. It is tragic then to find that a few of our very neighbors are ready to betray their own people and their own soil. But all their resourcefulness and cunning cannot, I believe, do more than to slow up, temporarily, the great revival which President Roosevelt has planned for this beautiful section of America.

The loyalty of the men and women of the South to the President's plan for the public development of the Tennessee River is one of the most heartening things in American life today. In great cities such as Chattanooga, and in crossroad villages we find this same intense devotion to a cause and a leader. And so I have no fear but that the future of the Southeast is assured. The South and TVA are riding on the tide of our time.

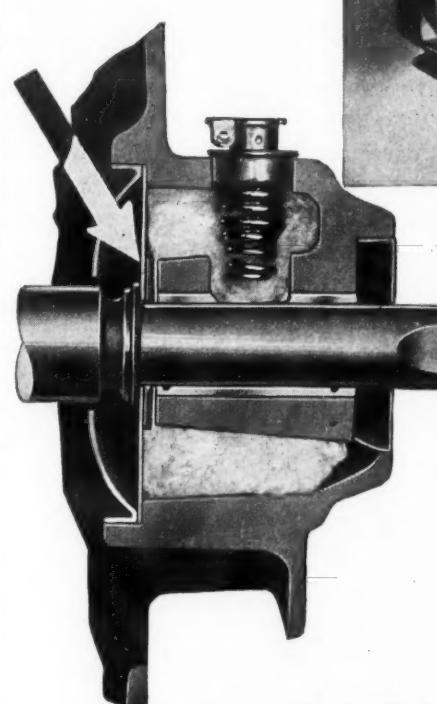
Durable end-play silencers

TWO ON EACH MOTOR ... SPRING-STEEL

CONSTRUCTION ASSURES LASTING QUIETNESS . . .



Another Exclusive
Feature of the 1935
General Electric
Type KC Capacitor-
Motor



IN the G-E Type KC capacitor-motor for 1935, end bump is effectively cushioned at both ends of the motor. Lasting, trouble-free protection is assured by per-

manently built-in construction of the two spring-steel silencers. Free movement of the rotor is retained, thus assuring quietness without wear or power loss from added friction. This is an exclusive General Electric feature.

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Check these features—see for yourself why the 1935 CARE-FREE CAPACITOR-MOTOR is the greatest value ever offered for domestic refrigerators . . .

RESILIENT MOUNTING
AUTOMATIC BELT TIGHTENER
LARGE OIL CAPACITY

CAST-ALUMINUM ROTOR
BUILT-IN TERMINAL BOX
QUIET, RELIABLE SWITCH

To insure unit responsibility for the electric equipment of your refrigerator, order G-E cold-control units, and cable, with the motor. For complete information on these G-E products, address General Electric, Dept. 6—201, Schenectady, N. Y.

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GENERAL ELECTRIC

ELECTRIC REFRIGERATION NEWS

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Dairy Developments

THROUGHOUT the depression the commercial refrigeration industry has been in a discouraging slump. In particularly bad condition has been the business of selling machines and display cases to grocery stores, meat markets, delicatessens, and their relatives in the food retailing classification of merchants. The sale of commercial refrigeration equipment has notably paralleled general business conditions all over the country, in great contrast to the household refrigeration business.

During this period, however, two segments of the commercial market have held steadfastly good, and have been veritable life savers to the hard-working sales engineers who have been attempting to keep alive this division of the refrigeration industry. These commercial market divisions which have been successfully cultivated year after year are the baking industry and the dairy industry. Of these, of course, the dairy industry is the much more important.

Research Engineers

Because refrigeration is absolutely vital in almost every phase of the business of selling milk and milk products "from cow to consumer," and because the demand for dairy products is generally among the last things to be affected by the downward plunges of business cycles, it well behoves the refrigeration industry to keep in close touch with the dairy business, and to watch the direction developments in that industry are taking.

Last week in Cleveland the annual dairy exhibition and combined conventions of the leading dairy associations—which comprise each year the largest industry gathering in the country—attracted comparatively few refrigeration exhibits, but a great many refrigeration men. These latter were chiefly research engineers, those whose business it is to study trends and design products which sales organizations can merchandise profitably when those trends become markets.

Evaporated Milk, Vitamin D Ice Cream

From listening to the discussions in the multitude of convention sessions during the week, and from the myriad of hotel room confabs, luncheon conversations, and night club arguments, the refrigeration men present at this mighty gathering of dairymen were impressed with one major trend and one future possibility as being the most interesting and important developments in the dairy industry in recent years.

The major trend which caused so much discussion at the convention is toward the consumption of evaporated milk. This trend should concern the refrigeration industry almost as much as it does the whole milk producers, for evaporated milk—being canned—does not need refrigeration in transport or in the dealer's store.

Consumption of evaporated milk is increasing rapidly each year; and although milk condensers declare that this increased production is not obtained at the expense of whole milk consumption (graphs were displayed at the convention

showing that whereas whole milk consumption has increased 12 per cent during the last eight years, evaporated milk consumption has increased 97 per cent during the same period), the whole milk producers are worried lest evaporated milk make serious inroads into their business in coming years.

Insofar as the evaporated product creates new customers for milk, the refrigeration industry should be happy; for that means that more home refrigeration will be necessary (once the can is opened, the milk must be kept at a low temperature).

The future possibility which interests refrigeration development engineers so much is Vitamin D ice cream. Most notable has been the spread of Vitamin D milk during the last year and a half. Whether by irradiation or the simple injection method, dairy after dairy has adopted means of capitalizing on this important discovery. The idea that both children and adults can obtain the health-protecting effects of sunshine in the winter-time by drinking it in milk has caught on rapidly. Moreover, dairies have found that the demand for Vitamin D milk continues apace in the summer.

Now comes the advent of Vitamin D ice cream, designed to increase the winter ice cream trade. For years one of the biggest problems of the ice cream business is how to stimulate winter consumption. In Vitamin D ice cream they think they may have an answer. Lack of sunshine (Nature's dispenser of that mysterious but vitally necessary health-giver, Vitamin D) in winter is blamed for many ills—and among these are poor complexions.

Ice Cream as a Beauty Aid

If the ice cream manufacturers of the nation could ever convince America's feminine population that eating Vitamin D ice cream in winter would not only help them stay free from colds and serious diseases, but would keep their complexions clear and fresh, the problem of how to keep the ice cream production curve from dropping like the stock market in the fall of 1929 would be solved. Nothing in modern merchandising has such purse-opening propensities as a beauty aid.

What does this mean to the electric refrigeration industry? Just this: If the sale of ice cream can be made a year-round, instead of a seasonal business, the market for electrically refrigerated ice cream cabinets and soda fountains is going to be measurably stimulated. So long as ice cream retailing is a seasonal business many small retailers will refuse to make the capital investment required for mechanical refrigeration equipment—using ice instead. If business were even reasonably good in the winter, there should be little economic justification left for argument against the installation of electric refrigeration for ice cream keeping.

To return to the mammoth gathering of dairymen in Cleveland last week, representatives of the refrigeration industry present had the opportunity to renew their appreciation of the progressiveness and the scientific attitude of the dairy industry. So long as its leaders continue to be so forward looking and so analytical of their business, the refrigeration industry—which depends on the progressiveness of its prospective customers for its livelihood—can feel secure in the thought that the dairy industry seems likely always to provide a good and satisfactory market for refrigeration products.

WHAT OTHERS SAY

A Top Heavy Merchandising Personnel?

ONE of the astounding developments of the past decade has been the rapid increase in merchandising personnel. In the recent study, "America's Capacity to Produce," we find that the number of people engaged in the sale and distribution of goods rose between 1920 and 1930 about three and one-half times as rapidly as the increase of physical production in manufactures—39 per cent as compared with 11 per cent. There is suggested here a steady lessening in efficiency. True, this may be offset by the considerable increase in services—customer, styling, artistic, etc.—which accompanied sales efforts during the twenties. Even so, these figures raise the thought that perhaps we had a piling up of services, frequently non-essential, and in some cases of little benefit to those who received them. Advertising & Selling, Sept. 27, 1934.

LETTERS

Replacement Parts

Kronson Service Co.
423-425 Genesee St., Buffalo, N. Y.
Oct. 12, 1934.

Editor:

The Kronson Service Co., a few years ago opened a small shop as distributor of radio replacement parts. Today, if you will investigate, we believe you will find that we have grown and have become known as "The" radio distributor of western New York. We are now handling on the exclusive plan products of all the big names in radio and at such a time as you may ask for them we can offer them to you as credit reference.

We have now come to the stage where we believe that Buffalo and vicinity are ready for a replacement parts distributor on all refrigerator parts. We feel that having successfully pioneered the radio parts business, that the refrigerator parts business will not be altogether foreign to us.

Therefore, we ask your suggestions. We wish to get this department established in the shortest time possible.

ERNEST KRONSON.

Holmes Service Data

Calhoun Office Supply Co.
124 West Main Street
Spartanburg, S. C.
October 9, 1934.

Editor:

Please advise us if you have published service on Holmes refrigerators. If it has been published we will appreciate your sending us the copy of the News in which it was published. If it has not been published advise us when it will.

E. N. BUTLER,
Frigidaire Dept.

Answer: The third and final article on how to serve Holmes electric refrigerators will be found on pages 13 and 14 of this issue. The first article appeared in the Oct. 10 issue of the News and the second one in the Oct. 17 issue.

Polk Survey Disputed

Bureau of Radio and Electrical Appliances of San Diego County 600 Electric Bldg., San Diego, Calif.

Editor:

During the hectic days of our local Electrical Exposition (I believe you were sent a resume of it) the News simply arrived, but now that business is getting back near normal, copies of several weeks back are coming in for close inspection.

Today in scanning the issue of Sept. 19, an article on page 14 attracted my attention for it had to do with Polk Survey figures covering San Diego, as well as other California cities. Imagine my chagrin (for we are a bit proud here) to note that the Polk figures credit San Diego with but 4,740 refrigerators for a saturation point of 10.59 when in reality the total is nearer three times that, both as to refrigerators in use and as to the saturation point.

As a matter of fact, the figures which are quoted in the article in question were obtained here nearly two years ago when the Polk survey was conducted in San Diego. At that time, they were proved absolutely wrong by reference to installation and sales records which we have. Even then, one make alone had sold and installed approximately the total number of refrigerators which the survey credited to San Diego, and the saturation point was far beyond the 10.59 quoted.

As of Jan. 1, 1934, we had approximately 12,000 electric refrigerators in use in San Diego for a saturation point of 26.7 per cent. Incidentally, this is one place where we know what we are talking about when it comes to keeping records of refrigeration activities and the gross inaccuracies of the Polk Survey annoy us a bit.

I appreciate the fact that the ELECTRIC REFRIGERATION News has no way of checking figures which are submitted by such firms as R. L. Polk, and therefore assume you will welcome definite information such as I have given. I am not concerned in any way with the figures which this organization may have assembled elsewhere, but wish to vigorously condemn as inaccurate those which were released covering our local electric refrigeration activities. Such figures would obviously be most misleading to anyone interested in studying this market.

In connection with the subject of figures, you may be interested to know that we have already sold over 3,000 electric refrigerators in San Diego County (about 75 per cent of the country population is in San Diego city) so far this year and have reason to feel that we should reach our quota of 4,000 set at the beginning of the year.

During our Electrical Exposition just concluded, which drew the rather substantial attendance of 72,000 in four days and five nights, every

electric refrigerator offered for sale in this territory was displayed. We believe this activity will sustain interest in refrigeration until we move in with our usual Christmas campaign.

Speaking of expositions, you have perhaps noted that San Diego is to have a real drawing card next year through its California Pacific International Exposition which is to open here next May. Surely this would be an excuse for you or someone else from the News to make a trip to San Diego. Perhaps if we start working on you soon enough, you may visit southern California. At least here's hoping.

J. CLARK CHAMBERLAIN,
Secretary-Manager.

Machine Information

906 E. Marvin St., Waxahachie, Tex.

Editor:

Am operating a repair, maintenance shop in Waxahachie, and am going to include the smaller type of refrigerating machine soon.

Was in Dallas, Tex., yesterday and had a talk with Mr. Knight of the Graybar Electric Co. He furnished me with some data on Kelvinator and referred me to you people for further information on other machines.

Would consider it a great favor if you people would send me a copy of your magazine or news, and the cost of a year's subscription, also other information in reference to maintenance manuals, etc.

EARL B. COOK.

Printer, Please Note

Weldsteel Supply Co.
453 S. Beretania St., Honolulu, T. H.

Editor:

We received the Sept. 19, 1934, issue of ELECTRIC REFRIGERATION NEWS, and wish to advise that two or three pages of the News are not readable at all. We would appreciate it if you will send us another copy of this issue.

PAUL STERMER,
Manager.

BOOKS

America's Capacity to Produce

Authors: Edwin G. Nourse and Associates. Publisher: The Brookings Institution, Washington, D. C. Pages: 608. Price: \$3.50.

The principal question raised and answered in this book is:

"Did actual production even in our most prosperous years utilize our full productive capacity, and if not, how much latent capacity was there which might have been drawn upon for the satisfaction of people's wants through some better method of handling our economic affairs?"

The authors attempt to measure only the possibilities of increasing productivity with existing capital and labor supply and under existing methods. Except in the final chapter, they pay no attention to the increase possibility as a result of scientific discovery, mechanical inventions, advancing techniques, and improved labor efficiency.

Estimates and conclusions were drawn from a detailed record made of the productive capacity of the United States in raw materials, fabrications, and services during the period 1900 to 1930. The analysis is well fortified with charts and figures.

The authors state their conclusions briefly as follows:

"In a word, the conclusions arrived at in the analyses of the several branches of industry mean that our productive system as a whole was operating at about 80 per cent of capacity in 1929 and slightly less than that if we take the average of the five years 1925-1929. If this 20 per cent of our resources not utilized could have been brought into production, it would have added goods and services to an amount one-fourth as great as the total which we were already getting from the operations of those years."

Nourse and his associates state "taking our economic world as a practical going concern, we know that sustained operation at 100 per cent of capacity would be impossible." They take into consideration factors that would reduce expectation of full capacity from potential 100 per cent to a more reasonable 95 per cent, which leaves a margin of 15 points above the actual performance (80 per cent) as probably attainable. "This," say the authors, "would mean an increase amounting to 19 per cent above what we produced in the late twenties."

This volume is the first of a series of four studies published by the Brookings Institution. The other volumes in the series are "America's Capacity to Consume," "The Formation of Capital," and "Income and Economic Progress."

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Solid CO-2 Ice Cream Cabinets Shown by American Radiator & Driice at Dairy Show

CLEVELAND—Two new ice cream cabinets using solid carbon dioxide were introduced at the Dairy Industries Exposition here last week, and numerous refinements were shown in standard lines of refrigerated trucks and accessory equipment. The new ice cream cabinets were displayed by the American Radiator Co. and by Driice Appliances, Inc., a new manufacturer in Mt. Vernon, Ill.

American Radiator's new cabinet represents the entrance of that manufacturer in a new field. The cabinet, as described in last week's issue of the News, employs a secondary refrigerant to transfer refrigeration from the dry ice to the ice cream compartments.

Driice Appliances' new cabinet similarly takes a cake of dry ice through a top lid, with a controlled circulation of a sealed secondary cooling medium to regulate its consumption.

Feature Square Compartments

A number of the ice cream cabinets this year have square compartments instead of round ones, and have hinged lids. The change in shape gives increased capacity and greater ease of storing square-packaged ice cream, and is also claimed to accommodate more bulk ice cream.

Kelvinator displayed a new line of ice cream cabinets with the square wells, as did the Wisner Mfg. Co.

Wisner's cabinet has an upper tier of movable half-depth compartments which are suspended from ball-bearing wheels rolling on tracks near the top of the cabinet. These compartments are rolled out of the way when ice cream is obtained from the bottom of the cabinet.

Waltham System, Inc., showed its line of ice cream cabinets and the triangular cartridges of eutectic brine which are frozen hard at a dairy plant and placed in ice cream cabinets or refrigerated trucks.

Along with its complete line of ice cream cabinets, Frigidaire had on display the "Flowing Cold" milk coolers, Frigidaire condensing units, water coolers, and air-conditioning equipment.

Other ice cream cabinets were displayed by Grand Rapids Cabinet Co., C. Nelson, Anheuser-Busch, and Fitzgibbon & Crisp.

Refrigerated Trucks

As at previous dairy shows, refrigerated trucks were one of the principal centers of interest last week. The problem of a drive for the refrigeration compressor while the truck is on the road has been approached from two new angles in the equipment shown.

The Whitaker-Upp electrical system, which uses a constant-voltage direct-current generator direct connected to the truck motor to furnish power on the road, was demonstrated in a Robbins & Burke truck in the Kelvinator exhibit, and in the Anheuser-Busch truck. The motor which drives the compressor in this system is a double affair, one end operating from alternating current while the truck is in the garage, the other from direct current on the road.

Louis Allis Drive

The Louis Allis Co. showed a constant-speed drive, operative by a power take-off from the truck engine, and using a direct-current circuit on the truck's storage battery to control the speed at which the compressor is driven. This outfit also has an alternating-current motor for operation in the garage.

The Kold-Hold system of eutectic brine cooling units which are frozen at night, either from a stationary refrigeration plant or from an alternating current motor driving a compressor in the truck, were much in evidence among refrigerated trucks at the show.

The Kold-Hold exhibit contained both types of trucks, one with its own independent alternating current operated refrigeration system (Universal Cooler), the other for connection to an ammonia plant.

Meyer & G-E Trucks

Meyer Body Co. showed a truck with the gasoline engine drive, built for automatic operation with a self-starter on the Briggs & Stratton engine to start the machine when the thermostat calls for refrigeration. Armstrong's LK corkboard insulation, a Kelvinator methyl chloride compressor, and non-frost evaporators are other features of the truck.

General Electric's truck uses an alternating current generator on the road (driven by a V-belt on a power take-off on the transmission) which provides power for the alternating current refrigeration unit—a two-cylinder G-E compressor using Freon.

For pre-cooling or night storage the system is plugged into a standard 220-volt a.c. supply.

The body is built by General Electric, and is of welded steel construction. Oak door frames are insulated with Thermocraft, and main insulation of the body is Thermocraft with Insulite next to the compartment walls.

A new refrigerated truck for solid carbon dioxide was shown by Driice Appliances. This has a compartment in the top for storage of dry ice for extended trips from the source of supply. It uses a secondary cooling fluid for regulation of the refrigerating effect.

Several manufacturers of solid carbon dioxide ice demonstrated the unique properties of their refrigerant with display blocks of the material. Among these were Dry Ice, Inc., Liquid Carbonic Co., Mathieson Alkali Works, Inc., and Michigan Alkali Co.

Other Suppliers Exhibiting

Suppliers of parts and materials used in refrigeration were also prominent at the show. Among these were the following:

Aetna Rubber (ice cream cabinet lids and brine hole stoppers).

Armstrong Cork (insulation).

Bristol Co. (instruments and controls).

Century Electric Co. (motors).

Creamery Package Co. (coolers).

Cherry-Burrell (milk-cooling tanks, surface coolers, Vogt ice cream freezers).

Chester Dairy Supply (milk coolers).

Fort Wayne Dairy Equipment (milk coolers).

International Nickel Co. (Monel metal).

Jensen Creamery Machinery (surface coolers).

A. E. Kaestner (surface coolers).

H. H. Miller Industries Co. (ice cream freezers and brine coolers).

Mojonier Bros. (stainless steel coolers).

Mundet Cork (insulation).

Power Regulator Co. (thermometers and controls).

C. J. Tagliabue Mfg. Co. (thermometers and controls).

Taylor Instrument Co. (recording and indicating instruments).

Emery Thompson Machine (ice cream freezers).

United Cork Companies (cork insulation).

Vogt Processes, Inc. (ice cream freezers).

York Ice Machinery (ice cream freezers and surface coolers).

Question of State Tax Aired at Hearing

(Concluded from Page 1, Column 3) one relating to its own costs of generating and transmitting electricity, the other relating to costs in municipalities which purchase current from the TVA. First as to its own costs, Mr. Lilienthal said in the hearing, as already noted, that payments equivalent to taxes would be made to the State.

The Act creating the TVA provides that 5 per cent of the gross proceeds from the sale of its power shall be paid to the States within which the dam sites are located. The first such payment was made to the State of Tennessee on July 10 last, in the amount of \$40,000.

On the subject of retiring the cost of the power projects, TVA Chairman Arthur E. Morgan is on record as declaring that, once the program gets on its feet, revenues will retire the entire cost within 25 years.

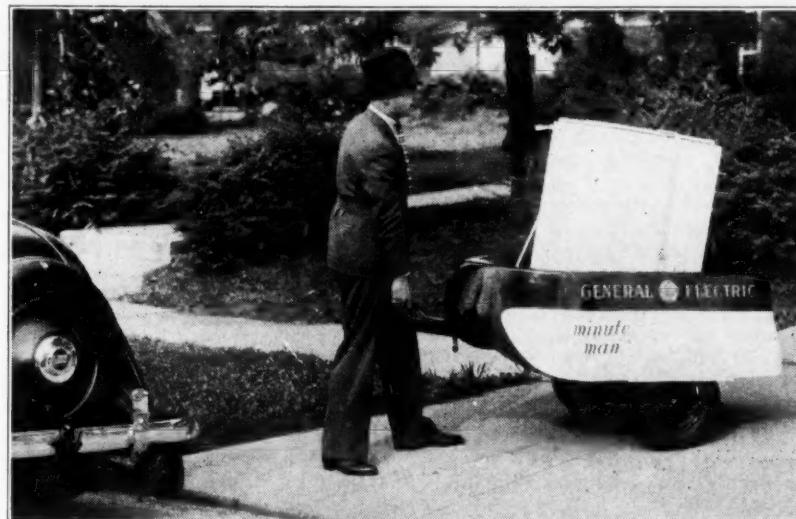
With respect to costs in municipalities which purchase current from the TVA—when current is sold to a municipal system, the 20-year contract of sale provides that the municipality must keep separate accounts for its electricity department exactly as if this department were an independently operating company. From the revenues of the department must be paid the sum as would be required in taxes and debt retirement of a private corporation.

These terms have been written into the contracts already signed. It is the announced purpose of the TVA to have all future contracts follow the same model. In this manner, officials hope to meet all criticism against their system as a genuine yardstick.

In the mean time, TVA is going ahead with plans for selling the power which it hopes to have available in 1936. The output from the Wilson dam is now sold, but when the Norris dam is completed in an estimated two-year period, the effect will be to increase substantially the salable power which the Wilson dam will generate, in addition to what power will be developed from the Norris dam itself.

The explanation of this is that the Norris dam, which is above the Wilson dam at Muscle Shoals, will regulate the flow of the Tennessee River, thus leveling out seasonal inequalities. With this addition to the power that can be counted on all year 'round, the salable current generated at the Wilson dam will increase.

Bringing Product to Prospect



General Electric distributors and dealers are using a small trailer delivery car, known as the "Minute Man." The trailer can be attached to any automobile in a moment's time and detached just as quickly.

Armco Opens Branch Office in Buffalo

Stern & Co. Distributes Grunow Products

MIDDLETOWN, Ohio—American Rolling Mill Co., headquartered here, has opened a new sales office in Buffalo, located at 17 Court St. building. V. L. Conley, formerly assistant district manager of the Cleveland sales district, has been transferred to the Pittsburgh district to function as assistant district manager in charge of the Buffalo office. Mr. Conley will be assisted by A. W. Bryant, with headquarters at Rochester, N. Y. Territory assigned the new office includes all that in New York from Utica west, and Erie county, Pa.

HARTFORD—Stern & Co. of this city has just been appointed distributor for Grunow refrigerators and radios, according to Francis E. Stern, president of the concern.

Announcement of the new connection was made in unorthodox fashion. Mr. Stern held a dinner for his dealers, at which he first informed them of his relinquishing the Zenith radio line, then introduced the two new Zenith distributors in this territory. A Zenith factory representative then addressed the group and presented the new Zenith line.

Warren Heads Firm Selling Chrysler Air Coolers to Shows

(Concluded from Page 1, Column 3) American Telephone & Telegraph Co., and for years head of its radio activities. He was the builder and executive in charge of WEAF radio station, later disposed of to the National Broadcasting Co. For the last seven years he has been an executive of Electrical Research Products, Inc., a Western Electric subsidiary. He will be executive adviser to Mr. Warren.

Arthur E. Ralph, for years with Electric Research Products, Inc., and prior to that with R. Hoe & Co., and the Winchester Arms Co., will head the division of survey and installation as well as be assistant treasurer of the corporation.

I. M. Magnus will be secretary.

Announcement of the personnel of the sales organization of the Control Corp. of America will be made shortly. Installations will be made on time payment plans.

F. B. Warren has been with Electrical Research Products, Inc., for six years as a sales executive. For 20 years he has been known to many owners and exhibitors in the theater business.

He was one of the founders as well as vice president in charge of sales and distribution of the original Goldwyn Co., later merged into Metro-Goldwyn-Mayer.

Connolly Joins Staff Of Allen-Bradley

NEW YORK CITY—Frank J. Connolly has been appointed sales engineer for the New York office of the Allen-Bradley Co.

For over ten years Universal Cooler products have borne a reputation for good character among the public and the trade. The reason for this is obvious. No refrigeration units give more dependable performance than those produced by Universal Cooler.



UNIVERSAL COOLER CORPORATION
DETROIT, MICHIGAN

BRANTFORD, ONTARIO

MANUFACTURERS OF A COMPLETE LINE OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT

AIR CONDITIONING

150-Ton System Used To Cool Baltimore Department Store

BALTIMORE—An air-conditioning system using Frick refrigeration equipment has just been installed in the Hochschild-Kohn department store here by Paul J. Vincent Co. The conditioner has a 150-ton cooling capacity and operates in the central unit of three buildings occupied by the organization.

Conditioned space includes the entire first floor, and the whole basement; also the book shop, the lunch room and soda fountain, the mezzanine where men's furnishings are sold, and the first floor of the economy shop on the third floor of the mezzanine.

Feature of the installation is the fact that the entire cooling effect is obtained from eight suspended units; the farthest of these is 360 feet from the refrigerating machines, to which they are all connected for direct expansion operation.

Each department has an individual Trane air-conditioning unit designed and built to take care of its needs. No filters are employed, but heating elements are used to regulate humidity and warm the rooms in winter. From 20 to 25 per cent fresh air is admitted.

Each unit is controlled in both heating and cooling by the Johnson Service air system. This actuates the valves on both the Freon liquid line and the steam supply line and controls the operation of the fresh air and re-circulation dampers. Humidistats regulate the flow of steam, more steam being applied if the air is too damp, since extra refrigeration is then required to remove the moisture.

Liquid level control is used on the large unit supplying the first floor of

the main store building; the other units have dry expansion feed. The Freon liquid line is 2½-in. size and the suction line measures six in.

The Freon compressors occupy a space in the engine room, where electric current for the store was formerly generated by steam engines. The 11½x10 compressor is rated at 100 tons refrigeration and is hand operated. The smaller machine, with 8½x6 cylinders, delivers 50 tons refrigeration and is automatically started and stopped as a booster to balance the load. The system is charged with 1800 lbs. of Freon.

Charles L. Leopold of Philadelphia was consulting engineer for this installation.

Oil Burner Installation Code Amended

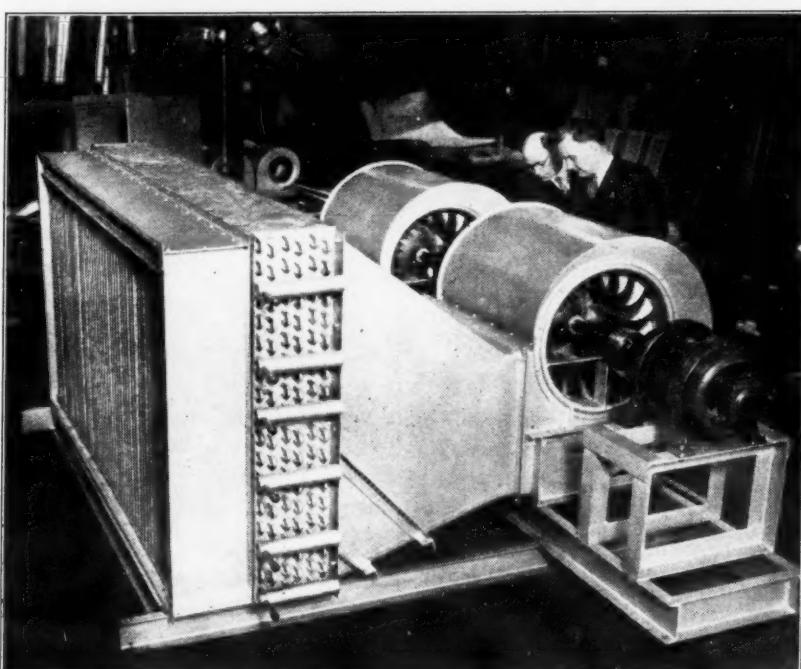
MIDDLETOWN, Conn.—Changes in the original oil burner ordinance, regulating installation of oil burners and storage of fuel oil which became effective here last January, were made recently by the Common Council of Middletown, on the recommendations of Michael W. Lawton, fire chief.

Amendments are as follows:

Any person selling, installing, or servicing oil burners must obtain a license from the fire chief, after proving his capability. There is a fee of \$2 for the license and for each annual renewal. Dealers in fuel oil must also obtain a license, renewed annually, for which there is no charge. Users of oil must pay a fee of 50 cents for a license, covering inspection, but need not obtain renewals.

Other provisions in the amendments include specifications for tanks and containers, stipulation of a minimum flash point of 110° F. requirement of a device on each burner to prevent flooding and of proper chimney connections.

Trane Coil Ready for Shipment



Large cooling coil in Trane Co.'s plant, ready for shipment to a large manufacturer of chocolate candy.

Delco-Heat Conditionair Will Be Installed In Model Home

NEW YORK CITY—"America's Little House," demonstration home to be exhibited here as a model for home owners of moderate incomes throughout the nation, will have several features of modern air conditioning.

Delco-Heat "Conditionair," recently introduced by the Delco appliance division of General Motors, will supply heating and air conditioning in the house, which the New York Committee of Better Homes in America is building in collaboration with the Columbia Broadcasting System at Park Ave. and 39th St., Manhattan.

Conditionair will purify, heat (warm air), circulate, and humidify the air in the Little House in winter, and purify and circulate it in summer. Oil is the fuel. Air is circulated through ducts by an electrically operated fan connected with a central oil-burning heater unit. During the heating season the unit also provides hot water which is delivered to a 40-gal. storage tank.

Warm air is brought to the individual rooms by means of wall registers placed near the ceilings. At various points, such as the entrance hall and living room, stale air of lower temperature is removed through floor registers and carried back to the heating unit for filtering, humidifying and heating, and recirculation. Some fresh air is introduced by a duct running from a basement window to the general duct system.

The system will provide the Little House with six complete changes of air per hour. The adjoining broadcasting studio, control room, and guest gallery—from which programs will be broadcast over the Columbia network—will be provided with 10 changes of air per hour.

Conditionair system is regulated by a thermostat. A fan control prevents the circulation of cool air when the temperature in the heating chamber decreases below a certain point.

While the system does not dehumidify or cool the air in summer, it is expected to give a relative cooling effect by circulation of air. Windows and doors will be closed to prevent inflow of warm air and to retain the cooler temperature obtained over night.

Cooler basement air will be circulated occasionally during the daytime. At night the outdoor air will be introduced through the basement, purified, and circulated to the rooms, forcing the warm air up through the house and out of open second-floor or attic windows.

Formal opening of the model home was scheduled for Oct. 15. It is the committee's claim that the house could be duplicated—outside of New York—for \$6,000 to \$8,000.

Hartford Store Employs Carrier System

HARTFORD, Conn.—Air conditioning for 50,000 sq. ft. of floor space has been installed by Carrier in the department store of G. Fox & Co., here. The system has sufficient capacity to be extended to the fourth floor beauty salon at a later date.

Interesting feature of the installation is the fact that the refrigerating machine is located under a warehouse across the street from the store. The cooled water from the machine comes through a tunnel to the dehumidifier which is in the sub-basement of the store.

Conditioners Operate In EH&FA Display

CHATTANOOGA, Tenn.—Electric Home & Farm Authority's Chattanooga display of electrical household equipment, opened Sept. 20 in the James building, offers a continuous working demonstration of air conditioning as it is applied to business and to homes.

Two Westinghouse RW-12 condensing units and four ES-62 air-conditioning units are the heart of the system which supplies the ground floor showrooms with conditioned air, cooled in summer and heated in winter. Air conditioning for homes and small offices is demonstrated by a smaller "Mobilair" unit.

Vault Used as Base

The main condensers and air conditioners are installed slightly above what normally would be the second floor level. A steel and concrete vault now out of use provided an ideal foundation and the units are mounted upon its top.

Fifteen-horsepower motors drive each of the condensing units directly. The complete unit is mounted on springs for balance and silence. Freon refrigerant gas tubes lead from the condensers to the four air conditioners.

These are so arranged that one, two, three, or four may be used at will. Either or both of the non-automatic 12-ton condensing units may be used. It is planned to hold the interior temperature at 10° below the outside temperature in summer, and to lower the relative humidity to 50 or 55 per cent.

Automatic Controls

All incoming air, winter and summer, is sucked through cleaning chambers. Winter temperatures and humidity will be controlled automatically. Two of the four available steam coils—one coil in each conditioner—will warm the air. Steam will be supplied from the building's central heating plant.

Winter humidity will be regulated by a humidistat placed in the show room and connected electrically to the humidifiers in the air conditioners. These humidifiers consist essentially of water jets spraying through the air flow. The humidistat, varying as the humidity of the conditioned air varies, turns these jets on or off.

Several complications confronted the Westinghouse and TVA engineers who installed the system.

Suction systems were needed to expel air from some parts of the floor while maintaining a continuous circulation in other parts. The displays include a complete laundry and kitchen, from which air is to be expelled. "Make-up" or replacement air—about 2,500 cu. ft. per minute—is to be drawn through a window near the ceiling level.

Four main ducts lead from the conditioners to the display spaces. One feeds four vents at the top and rear of the main show room, two others supply each of the sides, and another supplies the kitchen, laundry, and auditorium.

BUILT RIGHT—TO STAY TIGHT

Uniform

in material, workmanship, and interchangeability Commonwealth Brass Seepage-Proof Fittings have, for the past 25 years, been selected by leaders of the industry as superior products.

Behind the demand for these fittings is a determination on the part of Commonwealth to produce 100% merchandise. Backed by veteran experience in the brass business, the Corporation has at its command complete facilities for design, tooling, forging, machining, electro-tinning and every other requirement for volume production of fittings which are "built right to stay tight".

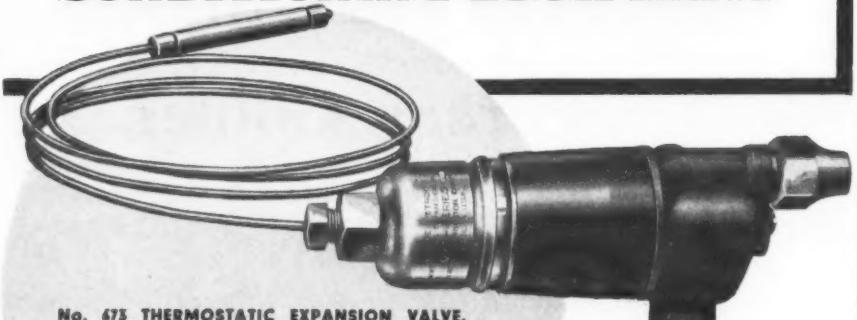
Old and new clients and customers alike learn to depend on Commonwealth for the best in refrigeration fittings. Not only does the Corporation excel in uniform production but it carries immense stocks of standard fittings and is prepared to make prompt estimates for the production of specials, in any quantity.

Quotations promptly on receipt of specifications, blue-prints, samples or sketches.

**COMMONWEALTH
BRASS CORPORATION**
COMMONWEALTH AVE. AND G.T.R.R.
< < DETROIT > >

Make

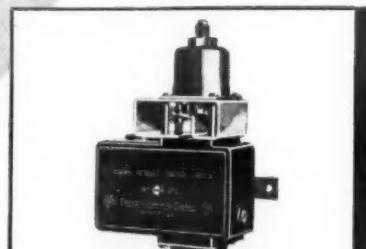
"GENUINE DETROIT" CONTROLS STANDARD on your AIR CONDITIONING EQUIPMENT



No. 673 THERMOSTATIC EXPANSION VALVE. Extremely sensitive and efficient. Takes up to 2 tons on Freon and Sulphur Dioxide and corresponding larger load on Methyl Chloride. Factory adjusted to keep the coil full of refrigerant without any possibility of a frost-back. Sealed against moisture. Equipped with Delubaloy metal needle and seat.

No. 674 THERMOSTATIC EXPANSION VALVE. Has same specifications as the No. 673 excepting it is non-adjustable.

No. 785 THERMOSTATIC EXPANSION VALVE. A large capacity valve that handles up to 8 tons on Freon. Eliminates necessity of using small valves in multiple on larger installations, simplifies coil construction. Also equipped with Delubaloy metal needle and seat.



No. 250 DUAL PRESSURE CONTROL SWITCH. Operates according to low side pressure or temperature and high side pressure cut-out. Also supplied in single control according to low side pressure or temperature.

The complete line of "Genuine Detroit" valves and controls for Air Conditioning equipment includes Solenoid Valves, cabinet controls, humidistats, thermostats, fan switches, motor units, etc.

DETROIT LUBRICATOR COMPANY

DETROIT, MICH., U. S. A.

Canadian Representative: Railway & Engineering Specialties, Ltd., Montreal, Toronto & Winnipeg



PATENTS

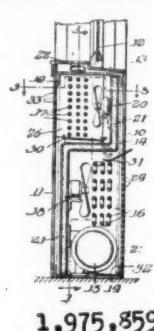
Issued Oct. 9, 1934

1,975,823. REFRIGERATOR. Joseph R. Alden, Grand Rapids, Mich. Application Feb. 15, 1932. Serial No. 593,067. 4 Claims. (Cl. 62-89.)

1. A refrigerator including a shell adapted to be arranged to extend through an opening in a dividing wall of a building, whereby portions of the shell will extend into different rooms of the building on different sides of the dividing wall, said refrigerator having a plurality of cooling chambers and a dividing wall separating said chambers, and separate doors in said refrigerator providing separate access to said plurality of cooling chambers of said refrigerator in the separate rooms.

1,975,853. ROOM COOLING APPARATUS. Rudolph S. Nelson, Rockford, Ill., assignor to The Hoover Co., North Canton, Ohio, a corporation of Ohio. Application No. 12, 1931. Serial No. 574,610. 6 Claims. (Cl. 62-129.)

3. In a device for cooling the air of a room in a building, a concealed unitary portable structure mounted in the wall



1,975,853

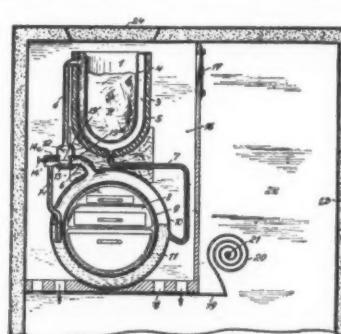
of a building, and having an insulating partition and a refrigerating apparatus mounted thereon said refrigerating apparatus including a cooling element and an air cooled heat discharging element disposed on opposite sides of said partition, said cooling element being arranged so as to permit it being exposed to the air in the room and said heat discharging element being so disposed as to permit discharge of heat to the air outside of the building, and said insulating partition being adapted to cooperate with portions of the wall of the building to substantially seal said cooling element from said heat discharging element.

1,975,860. ABSORPTION REFRIGERATION. Kurt V. Nesselmann, Berlin-Siemensstadt, Germany, assignor to The Hoover Co., North Canton, Ohio, a corporation of Ohio. Application May 25, 1933. Serial No. 672,744. In Germany February 13, 1932. 3 Claims. (Cl. 62-119.5.)

1. In a refrigerating system of the continuous type the combination with a number of vessels comprising a boiler, an absorber, a resorber and an evaporator of means for circulating a liquid through all of said vessels in succession and including a number of liquid conduits connecting said vessels in series, a portion of the resorber being in heat exchange relation with the conduit conveying liquid to the boiler, and means for conveying gas from the conduit conveying liquid to the boiler to the conduit conveying liquid to the resorber.

1,975,868. METHOD OF COOLING INDIRECTLY. Peter Schlumberger, Berlin, Germany, assignor to The American Thermos Bottle Co., Norwich, Conn., a corporation of Ohio. Application Feb. 9, 1931. Serial No. 514,598. In Germany Feb. 10, 1930. 6 Claims. (Cl. 62-91.5.)

2. Cooling apparatus comprising a condenser adapted to hold a primary refrigerant and an evaporator adapted to



1,975,868

hold a vaporizable secondary refrigerant, an outlet pipe connecting said evaporator with said condenser for the flow of vapor from the former to the latter, a return pipe connecting the condenser with the evaporator for the flow of condensed vapors to the evaporator, a valve in said outlet pipe for controlling the flow of vapors, and a thermostat directly controlled by the temperature of the secondary refrigerant for operating said

1,975,875. TEMPERATURE CONTROLLED CAR. Carl W. Spohr, Chicago, Ill., assignor to Mechanical Refrigerated Car Company, Chicago, Ill., a corporation of Illinois. Application June 2, 1932. Serial No. 614,883. 10 Claims. (Cl. 257-7.)

1. In a vehicle having a temperature controlling chamber and a temperature controlled compartment, the combination with separate forced draft and gravity draft air inlets from the compartment to the chamber; two air outlet passages from the chamber to the compartment; and temperature responsive means for selectively directing the air admitted under forced draft to the chamber through either of said outlet passages.

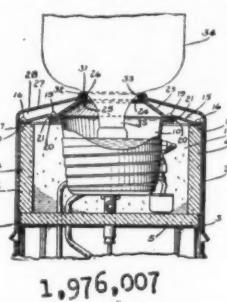
1,975,945. COOLING UNIT FOR REFRIGERATING SYSTEMS. Ernest R.

Hopkins, Kansas City, Mo., assignor of one-half to James P. Curry, Kansas City, Mo. Application Aug. 22, 1932. Serial No. 629,859. 9 Claims. (Cl. 257-71.)

1. A cooling unit for refrigerating systems having a liquid refrigerant, comprising a case; an intake port formed through the side of said case intermediate the top and bottom thereof; an exit formed at the top of said case; baffle plates within the case intermediate the intake port and exit; and a series of spray heads disposed to direct jets of water upwardly toward the said exit and from said intake port whereby to set up an air current through said case toward the exit, said baffle plates being angled downwardly to direct the released water through said air current toward the said intake port the baffle plates being projected toward each other from opposite sides of said case.

1,976,007. WATER COOLER. Harry E. Cullen and Henry O. Ronning, Minneapolis, Minn., assignors to Henry P. Watson, Minneapolis, Minn.; Alfred F. Pillsbury and Bessie Watson executors of said Henry P. Watson, deceased. Original application Nov. 4, 1931. Serial No. 572,971. Divided and this application September 2, 1932. Serial No. 631,539. 12 Claims. (Cl. 62-143.)

1. A chamber having walls of heat insulating material and having therein a receptacle, a first tubular cover having



1,976,007

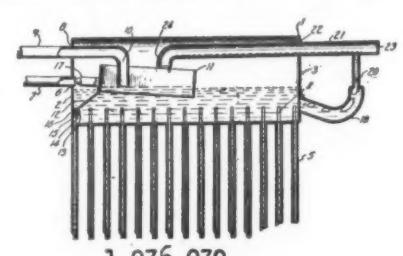
a stopper-like fit with the receptacle, a second cover attached to the receptacle and closing the chamber, a gasket supported by the first cover and surrounding the gasket in operative position including a wall-forming element which is spaced from and forms with said covers a dead air space adapted to oppose heat conduction to the chamber and receptacle, said element having a marginal frictional fit with the chamber walls and said gasket having a circumferentially continuous portion exposed to be sealingly engaged by the neck end of a bottle, when the bottle is positioned to empty into the receptacle.

1,976,008. INSULATING DEVICE. Harry E. Cullen and Henry O. Ronning, Minneapolis, Minn., assignors to Henry P. Watson, Minneapolis, Minn.; Alfred F. Pillsbury and Bessie Watson executors of said Henry P. Watson, deceased. Application March 13, 1933. Serial No. 660,510. Renewed March 31, 1934. 10 Claims. (Cl. 62-141.)

1. An insulating chamber having a receptacle therein open at the top, a first annulus having a flange sealingly circumferentially engaging the rim of the receptacle and being resiliently flexible, an annular gasket sealingly fitting the first annulus, a second annulus spaced from the first, said gasket and second annulus having means cooperative to cause the gasket to sealingly engage the first and second annuli when the second annulus is moved in a direction toward the first, and means by which the second annulus is moved for the aforesaid purpose to sealingly engage the wall of the chamber.

1,976,079. METHOD OF AND APPARATUS FOR CIRCULATING OIL AND REFRIGERATING MEDIUM IN REFRIGERATING SYSTEMS. Albert J. Mallinckrodt, Omaha, Neb., assignor to Baker Ice Machine Co., Inc., Omaha, Neb., a corporation of Nebraska. Application March 9, 1932. Serial No. 597,726. 6 Claims. (Cl. 62-126.)

2. Apparatus of the character described including a vessel having an inlet for mixed refrigerating medium and oil, a



float in said vessel having an upwardly opening chamber, a valve on said float controlling said inlet to maintain a normal liquid level and providing a vapor space within the vessel, a conduit opening to the float chamber above a normal liquid level therein, a line leading from below the normal liquid level in said vessel and having a restricted portion leading to said conduit, and a suction line leading from the float chamber.

1,976,101. EVAPORATING UNIT FOR REFRIGERATION. Maxwell T. Zeigler, Huntington Park, Calif., assignor to Central Ice and Cold Storage Co., Huntington Park, Calif., a partnership composed of John L. Zeigler and Cecilia M. Zeigler. Application Nov. 23, 1933. Serial No. 699,353. 10 Claims. (Cl. 62-95.)

1. An evaporating unit for refrigerating systems comprising means providing a reservoir for volatile liquid, means providing an evaporating space around the reservoir which is in communication with the reservoir above and below the normal liquid level therein, means for supplying the evaporating space with liquid, means for removing gas from the reservoir above the liquid level therein to be compressed and returned to the evaporating space as a liquid, and fins projecting outwardly from the evaporating space providing means.

1,976,102. HEAT TRANSFER DEVICE. Fred M. Young and Leon M. Young,

Racine, Wis., said Leon M. Young assignor to Young Radiator Co., Racine, Wis., a corporation of Wisconsin. Application Feb. 20, 1933. Serial No. 657,648. 5 Claims. (Cl. 257-227.)

1. In a device of the class described, comprising two headers, a housing, two rows of tubes and ends of which are connected to said headers, whereby liquid or gas may pass from one header to the other, the ends of said tubes being straight for a considerable distance from said headers, the remainder of said tubes being formed by three single curves of substantially the same length and radius two of which bend outward on opposite rows and the other or reverse curve forming the center portion of said tubes, whereby the space between the center of said rows is greater than the ends thereof, said housing adapted to slidably support and hold said headers in parallel relation.

1,976,147. ICE CUBE TRAY. Frank D. Smith, Jr., deceased, late of Washington, D. C., by Helen Smith, administratrix, Washington, D. C. Application Oct. 13, 1933. Serial No. 693,505. 15 Claims. (Cl. 62-108.5.)

1. In a freezing system for domestic refrigerators, the combination of a tray for molding cubes, a shelf for said tray, and means responsive to the expansion of water upon freezing for lifting the tray from said shelf and the formed cubes from the molds.

1,976,202. ABSORPTION TYPE REFRIGERATING SYSTEM. Albert R. Thomas, New York, N. Y., assignor to Electrolux Servel Corp., New York, N. Y., a corporation of Delaware. Application Dec. 21, 1932. Serial No. 648,148. 28 Claims. (Cl. 62-119.5.)

24. That improvement in the art of refrigeration with a system containing a refrigerant fluid and an auxiliary gas for equalizing pressure which comprises storing an excess of said gas at substantially the same partial pressure as that of gas in the system under normal operating conditions and circulating the stored gas in the system when the pressure in the system increases.

1,976,204. PROCESS OF MAKING ICE. Vanderveer Voorhees, Hammond, Ind., and Harold V. Atwell, Bayside, N. Y., assignors to Standard Oil Co., Chicago, Ill., a corporation of Indiana. Application Jan. 8, 1932. Serial No. 585,468. 5 Claims. (Cl. 62-172.)

1. The process of manufacturing ice comprising spraying water and a volatile liquid refrigerant into a freezing chamber maintained at a pressure such that the refrigerant completely volatilizes and converts all the water into snow, collecting the snow from the freezing chamber and compressing it into blocks to expel refrigerant vapors.

1,976,353. PORTABLE REFRIGERATED TRAY. Gordon J. McIntosh and Louis H. Caldwell, Youngstown, Ohio. Application December 16, 1932. Serial No. 647,570. Renewed Aug. 24, 1934. 2 Claims. (Cl. 62-91.5.)

1. In a device of the class described,

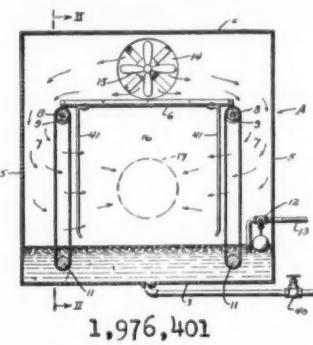
a portable refrigerated tray, suitable insulation in said tray, a top for said tray, cups formed in said top, a compartment in said tray, covers for said compartment, wire mesh containers for a cooling agent suspended from top of said tray, covers for said wire mesh containers, substantially as described.

1,976,364. HUMIDIFIER. Charles A. Olson, Geneva, Ill., assignor to Crane Co., Chicago, Ill., a corporation of Illinois. Application Jan. 30, 1931. Serial No. 512,249. 11 Claims. (Cl. 257-180.)

2. A humidifier comprising a plurality of spaced superposed hollow heating sections similar in size and connected together to receive a heating medium, said sections being arranged horizontally and formed with depressions in their upper surfaces, certain sections thereof being offset in a lateral direction and a base section, underlying said heating sections said base section being provided with supporting feet upon its under side and a depression upon its upper side to receive any surplus humidifying medium.

1,976,401. AIR CONDITIONING AND FILTERING DEVICE. Robert A. Ilg, San Francisco, Calif., assignor to Ilg Electric Ventilating Company, Chicago, Ill., a corporation of Louisiana. Application May 17, 1933. Serial No. 671,498. 2 Claims. (Cl. 183-9.)

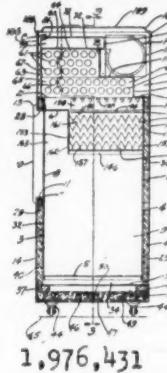
2. An apparatus of the character described comprising a housing having an air inlet and an outlet formed therein,



1,976,401

means for conveying water from said priming tank to said first mentioned trough member, and means for sucking air, from outside of the air conditioning unit, through the tubular members of said exchanger unit, said insulated tank, said plurality of trough members, and again through said exchanger unit between its tubular members, said last mentioned means further forcing the air outwardly from the air conditioning unit.

ing water, said trough member being located below said exchanger unit, a plurality of trough members one above another, said last mentioned trough members being located below said first mentioned trough member, each of said last mentioned trough members being provided with perforations for distributing water, a priming tank, means for pumping water from said insulated tank to said priming tank,



1,976,431

means for conveying water from said priming tank to said first mentioned trough member, and means for sucking air, from outside of the air conditioning unit, through the tubular members of said exchanger unit, said insulated tank, said plurality of trough members, and again through said exchanger unit between its tubular members, said last mentioned means further forcing the air outwardly from the air conditioning unit.

1,976,593. ABSORPTION APPARATUS. Edmund Altenkirch, Alt-Landsberg-Sud, Germany, assignor, by mesne assignments, to The Hoover Co., North Canton, Ohio, a corporation of Ohio. Application April 13, 1926. Serial No. 101,745. 77 Claims. (Cl. 62-119.5.)

76. That improvement in the art of refrigerating through the agency of an absorption system including a generator, an evaporator and an absorber, said system containing a cooling agent and an auxiliary agent in the presence of which the cooling agent evaporates, which consists in building up a liquid column pressure gradient and circulating said auxiliary agent between the absorber and evaporator due to said liquid column pressure gradient.

1,976,646. CONTROL CIRCUIT FOR HEAT PUMP TEMPERATURE CONTROL REGULATING SYSTEMS. Gilbert Wilkes, Jacksonwald, Pa., assignor to Wilkes Avery Corp., New York, N. Y., a corporation of New York. Application February 13, 1932. Serial No. 592,332. 27 Claims. (Cl. 62-4.)

1. In combination with temperature control apparatus including a pair of evaporator-condenser coils and a compressor reversibly connected in a closed series therewith, variable speed drive for the compressor, a reversible motor controlling the speed of said drive and a thermostat controlling the direction of rotation of the motor.



2 Horse Power Century Type RS, Single Phase, Repulsion Start Induction Motor

COMMERCIAL REFRIGERATION

Every motor requirement of manufacturers and users of Commercial Refrigeration Equipment is met with conspicuous success by Century—It is not uncommon to find Century Motor installations in service for more than 30 years...Single Phase, Polyphase, Direct Current...1/250 to 600 horse power...Consult Century Engineers.

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MOTORS

AIR CONDITIONING

STATISTICS

Value of Refrigerating and Ice Making Apparatus Made in 1933 Set at \$136,123,583

WASHINGTON, D. C.—Refrigerating and ice-making apparatus valued at \$136,123,583 (at f.o.b. factory prices) was made by U. S. manufacturers during 1933, according to a report from the 1933 Biennial Census of Manufacturers released by the Bureau of the Census of the U. S. Department of Commerce. This represents a decrease of approximately 31.7 per cent as compared with \$199,376,865 reported for 1931, the last preceding census year.

Employment of wage earners in plants engaged primarily in the manufacture of refrigerating and ice-making apparatus increased sharply from

21,796 in March, 1933, to 35,172 in June, and then suffered a decline to 26,762 in September, and fell off still further to 25,553 in December.

Table 1 shown below lists number of establishments, average wage earners for 1933, wages paid, and summarizes industry production according to value.

For census purposes, the Refrigerating and Ice-Making Apparatus Industry is considered to embrace establishments engaged wholly or principally in the manufacture of domestic and commercial mechanical refrigerators (including absorption type or heat-actuated) and refrigerating

systems (complete assemblies, consisting of "high side" and "low side" with motor, control, and expansion valve or equivalent), the manufacture of cabinets whether for mechanical refrigeration or ice, and the manufacture of industrial ice-making and refrigerating machines.

Production of self-contained domestic electric refrigerators in 1933 amounted to 956,356, valued at \$75,459,555, showing an increase of 34.9 per cent in number and a decrease of 16.6 per cent in value as compared with the 708,894 refrigerators, valued at \$90,447,442, produced in 1931.

Included in the 1933 total were the following: domestic household systems with cabinets under 6 cu. ft., 433,434, valued at \$27,347,092; with cabinets, 6 cu. ft. or more but under 10 cu. ft., 416,310, valued at \$39,104,540; with cabinets, 10 cu. ft. or more, 10,062, valued at \$1,935,362; not reported by size, 96,550, valued at \$7,072,561. Separate systems complete without cabinets, unclassified by size, totaled 37,728 with a valuation of \$1,658,519.

Commercial applications manufactured during 1933 were valued at \$7,469,249 as compared with \$15,520,179 in 1931. Items included in the 1933 total were as follows: self-contained, electrically refrigerated water coolers valued at \$975,743; ice cream cabinets, self contained and electrically refrigerated valued at \$1,715,699; other commercial refrigerators and display cases, self contained, with a value of \$4,777,807.

Compressors for sale separately numbered 29,961 with a valuation of \$3,484,275. Evaporators reported for sale separately were 16,953 in number with a value of \$621,763, while such evaporators for which number was not reported were valued at \$744,831. High sides and low sides made for sale separately were 22,292, valued at \$739,022. Production of miscellaneous equipment, not reported separately, was valued at \$517,158.

Separate cabinets and display cases for mechanical refrigerators, made to be sold separately, were produced as follows: domestic, all sizes, 455,744, valued at \$12,321,279; commercial (including cabinets, display cases, and remote fountain or water coolers with low sides) were valued at \$6,954,155.

Absorption-type refrigerators and parts for all types of refrigerators taken together were valued at \$14,326,916.

Table 2 at the left shows a complete itemized report of sales giving complete value figures for each type of equipment and also number figures where complete data was available.

"One of the most encouraging features of the current demand is the decided trend toward sets of the better grades. This is indicated by the fact that the average unit sales price is being raised steadily. The interest shown last year in sets which would pick up police stations rapidly is switching to those that will pick up foreign stations.

"The manufacturers are meeting this demand by producing moderately-priced sets that are able to deliver foreign reception satisfactorily. The all-wave sets, along with automobile radios, have served chiefly to bolster volume thus far this year, although since the early part of June there has been a decided increase in the sales of portable sets.

"Volume of sales during June and July in some of the eastern states fell below the comparative totals of 1933, but in the southwestern, middle western, and south Atlantic states, gains of 15 to 20 per cent were reported generally for these two months. In the Pacific Coast states, the strike of

"Careful supervision of credits now is practically universal in the radio field. Since the elimination of a considerable number of merchants whose chief effort appeared to be the forcing of sales, regardless of collection difficulties, there has been either a tightening of credits or an insistence on such security as would provide manufacturers with the means of recovery."

*Not including salaried officers and employees. Data for such officers and employees will be included in a later report. The item for wage earners is an average of the numbers reported for the several months of the year. In calculating it, equal weight must be given to full-time and part-time wage earners (not reported separately by the manufacturers), and for this reason it exceeds the number that would have been required to perform the work done in the industry if all wage earners had been continuously employed throughout the year. The quotient obtained by dividing the amount of wages by the average number of wage earners can not, therefore, be accepted as representing the average wage received by full-time wage earners.

†Manufacturers' profit or losses can not be calculated from the census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.

‡Value of products less cost of materials, fuel, and purchased electric energy.

Table 1—Summary for the Industry: 1933

Number of establishments	205
Wage earners (average for the year)*	26,512
Wages†	\$ 24,332,927
Cost of materials, fuel, and purchased electric energy‡	\$ 69,642,098
Products, total value	\$140,762,115
Refrigerating and ice-making apparatus	\$126,964,660
Other products	\$ 10,159,782
Refrigerating and ice-making apparatus and other products, not reported separately	\$ 761,147
Receipts for work done on materials furnished by others, and for custom and repair work	\$ 2,876,526
Value added by manufacturer	\$ 71,120,017

*Not including salaried officers and employees. Data for such officers and employees will be included in a later report. The item for wage earners is an average of the numbers reported for the several months of the year. In calculating it, equal weight must be given to full-time and part-time wage earners (not reported separately by the manufacturers), and for this reason it exceeds the number that would have been required to perform the work done in the industry if all wage earners had been continuously employed throughout the year. The quotient obtained by dividing the amount of wages by the average number of wage earners can not, therefore, be accepted as representing the average wage received by full-time wage earners.

†Manufacturers' profit or losses can not be calculated from the census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.

‡Value of products less cost of materials, fuel, and purchased electric energy.

Table 2—Refrigerating and Ice-Making Apparatus Production, by Number and Value: 1933

Refrigerating and ice-making apparatus:	Value
Total value	1933 \$136,123,583* 1931 199,376,865
Made in the Refrigerating and Ice-making Apparatus Industry	1933 126,964,660* 1931 91,589,923
Made as secondary products in other industries	1933
Mechanical refrigerators and refrigerating systems, compression type (electric)	1933 84,587,323 1931 115,208,475
Domestic (household):	
Self contained, total*	1933 956,356 1931 708,894
Commercial, total	1933 7,469,249 1931 15,520,179
Capacity:	
Under 6 cu. ft.	1933 433,434 1931 27,347,092
6 cu. ft. or more but under 10 cu. ft.	1933 416,310 1931 39,104,540
10 cu. ft. or more	1933 10,062 1931 1,935,362
Not reported by size	1933 96,550 1931 7,072,561
Systems complete without cabinets, all sizes	1933 37,728 1931 1,658,519*
Commercial, total	1933 7,469,249 1931 15,520,179
1933	
Water coolers, self contained	† 975,743
Ice cream cabinets, self contained:	
Number reported	3,499 613,522
Number not reported	1,102,177
Other commercial refrigerators and display cases, self contained	† 4,777,807
Compressors for sale separately	29,961 3,484,275
Evaporators for sale separately:	
Number reported	16,953 621,763
Number not reported	744,831
High sides and low sides made for sale separately‡	22,292 739,022
Miscellaneous equipment, including compressors, not reported separately	517,158
Cabinets, display cases, etc., for mechanical refrigerators, for sale separately:	
Domestic (household), all sizes	455,744 12,321,279*
Commercial:	
Refrigerator cabinets:	
Number reported	17,667 1,249,666
Number not reported	218,132
Display, storage, etc., cases:	
Number reported	8,425 3,922,535
Number not reported	1,283,075
Remote fountain or water coolers, with low sides	280,747
Ice refrigerators and ice boxes:	
Domestic (household):	
Number reported	226,852 3,273,663
Number not reported	776,223
Commercial ice refrigerators, water coolers, milk coolers, food display cases, etc.:	
Number reported	36,416 1,671,709
Number not reported	1,721,542
Commercial cabinets—display, storage, etc., cases not reported separately as to means of cooling, cabinets cooled by replaceable chemical refrigerants (Kold-Kans, etc.), and cooling equipment therefor	268,463*
Ice-making and refrigerating machines, industrial (rated ice-making capacity in tons per 24 hours), total	4,115,261
Less than 10 tons:	
Number reported	2,274 921,123
Number not reported	299,134
10 tons or more but less than 100 tons:	
Number reported	1,257 921,348
Number not reported	178,905
100 tons or more	† 736,607
Not reported separately by size	1,058,144
Absorption-type refrigerators and parts for all types	14,326,916
Refrigerating and ice-making apparatus and other products not reported separately (not included in totals at head of this table)	761,147

*The items for "Systems complete without cabinets" and for "Cabinets, display cases, etc." are duplicated in the totals at the head of this table and in the "Value of products" as given in Table 1, to the extent to which these products were sold to manufacturers in the industry, or were transferred from one plant to another under the same ownership for assembly and sale as complete refrigerators.

†Data incomplete.

‡Combined to avoid disclosing approximations of the data reported by individual manufacturers of absorption-type refrigerators.

markable showing made, the radio industry itself has contributed a major portion to the progress, due to the ceaseless efforts of manufacturers to improve their product.

"Even during the unfavorable years of 1930 and 1931, new designs for the appearance and performance of the sets were being passed on constantly to consumers, thus maintaining employment and pay rolls at a relatively higher degree than most of the other large industries.

"In the analysis of the 1933 operating averages of 229 retailers of radios, made by the statistical department of Dun & Bradstreet, Inc., it was found that a net profit was made by 142 concerns, or 62.01 per cent of the total number. These concerns had total 1933 net sales of \$3,151,700, or 72.57 per cent of the total volume. Of the 229 retailers reporting, with total 1933 net sales of \$4,342,700, a net loss was shown by only 87 concerns, or by 37.99 per cent of the total number.

"These concerns had total 1933 net sales of \$1,191,000, or 27.43 per cent of the total volume. In the analysis by Federal Reserve Districts, it was revealed that net profits were largest in Dallas, Kansas City, Philadelphia, San Francisco, Richmond, New York, and Cleveland, in the order named.

"One of the most encouraging features of the current demand is the decided trend toward sets of the better grades. This is indicated by the fact that the average unit sales price is being raised steadily.

The interest shown last year in sets which would pick up police stations rapidly is switching to those that will pick up foreign stations.

"The manufacturers are meeting this demand by producing moderately-priced sets that are able to deliver foreign reception satisfactorily. The all-wave sets, along with automobile radios, have served chiefly to bolster volume thus far this year, although since the early part of June there has been a decided increase in the sales of portable sets.

"Volume of sales during June and July in some of the eastern states fell below the comparative totals of 1933, but in the southwestern, middle western, and south Atlantic states, gains of 15 to 20 per cent were reported generally for these two months. In the Pacific Coast states, the strike of

the longshoremen, which started early in May and was not settled until the middle of July, brought sales practically to a standstill in the major distributing centers.

"Based on the trend during the past six months, the smallest number of failures in the history of the industry is to be recorded for 1934. Thus far, firms have been going into bankruptcy at the rate of three a month, whereas in 1933, the monthly average was 11. With the exception of the failure of one large wholesaler in January for more than \$1,000,000, the involved liabilities of the defaulting firms have been small, the total for the 20 failures for the first six months amounting to only \$1,465,906."

The complete insolvency record of the radio industry since 1930, including January of the current year, as compiled by Dun & Bradstreet, Inc., shows:

MANUFACTURERS		
Year	Number	Liabilities
1930	40	\$3,522,400
1931	15	4,088,445
1932	23	1,826,995
1933	25	3,719,519
1934*	4	24,330

WHOLESALE AND RETAILERS		
Year	Number	Liabilities
1930	217	\$2,071,392
1931	160	4,979,359
1932	170	1,978,678
1933	109	1,813,980
1934*	16	1,441,577

*January to June, inclusive.

"Despite some weakness that has developed in the price structure, the leading manufacturers are holding to code prices, and any alterations in present listings are expected to be in an upward direction. Prices generally have been steady since the first of the year at a level ranging from 10 to 20 per cent above the 1933 quotations. The medium sets and automobile units have held unusually firm, the instances of weakness reported being almost entirely period console types.

SERVICE

Analysis of Holmes Service Calls
With Suggested RemediesThird and Last Article on Servicing Holmes Refrigerators
Giving a Diagnosis of Each Service Trouble

CONCLUDING the series of three articles on servicing Holmes electric refrigerators, this week's installment presents an analysis of the service troubles commonly encountered with the Holmes machine, with suggestions for their correction. The first article on the Holmes (Oct. 10 issue of ELECTRIC REFRIGERATION NEWS) described the various elements of the Holmes refrigerating system. The second article (Oct. 17 issue) explained how to perform various service operations such as charging, checking for leaks, etc.

This week, practically all of the complaints that are made by Holmes users are listed in order, together with the causes which may be responsible for the various troubles, and followed by methods of finding each trouble and correcting it.

Machine Does Not Operate

Cause A—Sentinel Breaker Off

Examine the breaker. If the circuit has been opened by an overload, the lever on the breaker will be in the neutral position. To re-engage the breaker, move lever to the "off" position, then to the "on" position.

If the trouble which caused the breaker to open was temporary and has eliminated itself, the machine will start to operate and will run normally. Under these conditions, it would be impossible to determine what had caused the interruption of service.

If the machine operates normally until it cuts off on thermostat, you will be safe in assuming the trouble has eliminated itself.

If the condition described above is found, it probably has been caused by a temporary overload on the compressor or by electrical trouble outside of the machine. The breaker is installed in the circuit to protect the motor from damage under these circumstances.

Cause B—High Pressure

1. If, when you start the machine, pressure builds up, examine the fan. If the fan fails to operate, air will not be circulated over the condenser, with the result that you will have an excessive pressure. A simple test for the fan is to place a small piece of paper in front of the condenser. If the fan is operating, the paper will be held against the condenser; if not, the paper will drop to the floor.

2. If fan is operating and pressure continues to build up, purge the system at the float housing. This purges

ing operation should be continued until gauge readings are normal. Instructions for taking gauge readings were given in the Oct. 10 issue of the NEWS.

3. If pressure continues to build up, test the machine for overcharge. With the machine shut down, purge the system through the purge cock on the float housing. If liquid comes out of the purge cock, you will know that the machine is (1) either overcharged, (2) the float is stuck shut, or (3) that the liquid line, running from the float to the chilling unit is plugged.

4. With the machine running, apply an electro magnet to float housing and lift float ball. If the pressure of the gauge drops when you lift this ball, you will know the liquid is passing through the float, through the liquid line and into the chilling unit. Repeat this operation several times until the machine is operating under normal pressure.

If, after you have disconnected your electro magnet, the pressure remains normal you will know that the float was stuck and is now operating satisfactorily. Watch the machine for at least one-half hour to make sure that the float does not bind up again.

5. If, when you apply the electro magnet, pressure does not drop, it will indicate that there is a plug in the liquid line between the float and the chilling unit, or that the float is stuck in such a manner that the magnet is unable to lift it.

Remove the $\frac{1}{4}$ -in. tubing connection at the end plate of the float housing. As you loosen this nut, liquid will flow into the air. With the nut removed, note whether the liquid is flowing from the $\frac{1}{4}$ -in. copper tube feed line, or from the outlet of the float housing. If the liquid comes from the $\frac{1}{4}$ -in. tube, it will show this tube is clear. If the liquid comes from the float outlet, it will indicate the float is operating.

If the $\frac{1}{4}$ -in. tubing line is clear, plug it with the special cap. Open purge cock on float housing; if liquid comes out of this cock, you will know that there is sufficient liquid in the float to raise the ball and that the float is not operating. See instructions for changing the float assembly in the Oct. 17 issue of the NEWS.

When you remove the nut, if the liquid comes out of the outlet of the float housing, cap this connection to prevent the loss of liquid and disconnect the chilling unit end of the $\frac{1}{4}$ -in. feed line. Connect the drum of ethyl chloride to $\frac{1}{4}$ -in. line and endeavor to blow out the obstruction. If you can not secure a free flow of gas through this tube, replace it.

When you disconnect the $\frac{1}{4}$ -in. feed line from the bottom of the chilling unit, liquid ethyl chloride should flow from this connection. If it does not flow, it will indicate that the obstruction was in the elbow connection at this point and it should be cleaned out.

6. If none of the above conditions exist and the pressure still continues to build up, test for an air leak in the low side. See Oct. 17 issue.

Cause C—Electrical Circuit Out of Order

When you examine machine, if you find the sentinel breaker on the "on" position, or when you move the lever of sentinel breaker to "on" position and machine refuses to start, make the following tests:

1. Examine the fan motor. If it does not operate when you move the sentinel breaker to the "on" position, there is trouble with some part of the electrical circuit.

2. Test the thermostat. First, take hold of the plug connecting wire to thermostat to make sure that it is properly attached.

If the chilling unit is warm, and the thermostat is properly attached, remove the plug from it and insert a short circuiting plug. If the machine starts to run when you insert this shorted plug, you will know that the thermostat is not functioning. Replace the thermostat. (See Oct. 17 issue.) If the machine does not run with the

shorted plug inserted, look further for trouble.

3. Examine carefully all of the connections of the service and thermostat cord. Sometimes these connections work loose. Make sure that all connections are made properly and are tight. If you have made all of the above tests and are reasonably sure that the electrical circuit is in order, look further for the trouble.

4. Test the house fuses. Be sure they are all right. This is easily done by turning on an electric light bulb. In making this test, be sure you use a bulb in the same circuit that is operating the refrigerating machine. Most homes have two or more circuits and it is important that you test the correct one. If fuses are blown, replace them.

5. Examine sentinel breaker. If the circuit has been opened by an overload, the lever on the sentinel breaker will be in neutral position. To re-engage bi-metal contacts of the circuit breaker, move the lever to the "off" position and then move it to the "on" position.

To test the sentinel breaker for defect, remove the sentinel breaker name plate. Examine all wire connections to be sure they are tight. Use a test lamp with sentinel breaker lever in "on" position, apply the ends of the lamp wires to terminals No. one and three.

If lamp lights, the sentinel breaker is all right. If lamp does not light, sentinel breaker is not right. In this case, service the breaker (see instructions in Oct. 17 issue).

6. The Holmes machine was built with a.c. motors only. If you attempt to connect the machine to direct current, machine will not run. This trouble would occur only at the time of installation.

Cause D—Compressor Stuck

If the fan starts and the compressor fails to turn over when you move the breaker lever to the "on" position, the compressor will be stuck or bound. Move the breaker to the "off" position. Reduce the pressure on the

compressor by purging at the float housing. Remove fan shroud and fan (instructions in Oct. 17 issue).

Service Data on Other Refrigerators

This article is one of a series published by Electric Refrigeration News to give the service man help in servicing various makes of machines. Most of the makes described to date have been "orphan" machines on which service information is no longer readily available.

Service instructions on the following makes were published in these issues:

Absopure household.....	March 25, 1931
Majestic hermetic.....	Aug. 16, 1933
Allison.....	May 30 & June 6, 1934
Welsbach.....	June 13, 20, & 27, 1934
Rice household.....	July 4, 1934
Wayne household.....	July 11, 1934
Absopure com'l.....	July 18, 25, & Aug. 1, '34
Iceberg.....	Aug. 8, 1934
U. S. Hermetic.....	Aug. 15, 1934
Belding-Hall Electrice.....	Aug. 22 & 29, 1934
Majestic standard.....	Sept. 12, 19, & 26, '34

compressor by purging at the float housing. Remove fan shroud and fan (instructions in Oct. 17 issue).

Remove fan bracket from end of motor housing. The end of the motor shaft will be found in the opening from which fan bracket has been removed. Insert a tool in the end of shaft and turn the motor and compressor by hand in either direction. If you are unable to turn the compressor by hand, it will indicate that some foreign substance is jammed between the rotor blades and the cylinder.

If the compressor turns, operate it by hand until you have made several complete revolutions. Remove the tool and move the breaker to the "on" position. If the motor starts and the compressor continues to run, you have

corrected your trouble. Reinstall fan and shroud.

If, after you have freed the compressor and moved the sentinel breaker to the "on" position and motor fails to run, it will be due to motor trouble.

Machine Runs Too Much

Cause A—Improperly Charged

1. With an undercharged condition, you sometimes have sufficient refrigeration and ice cubes will freeze. The machine will run for long periods and rest for a short time. Examine the chilling unit. See "Undercharge of Ethyl Chloride," for which symptoms were given Oct. 17. If the machine is found short of ethyl chloride, add more to the system, as described on Oct. 17.

2. An overcharge of ethyl chloride will cause the same trouble with the difference that the chilling unit will be frosted all over, and the return line, part way back to the compressor. If the overcharge is greater still, the machine will operate continuously with no frost anywhere on the system. See "Overcharge of Ethyl Chloride," described Oct. 17. If unit is overcharged purge off gas until you (Concluded on Page 14, Column 1)

Extra Dry ESOTOO LIQUID SULPHUR DIOXIDE

V-METH-L METHYL CHLORIDE

VIRGINIA SMELTING Company

WEST NORFOLK, VA.
131 State St., Boston, and
76 Beaver St., New York

AN INVITATION

to every manufacturer

WHO IS LOOKING FOR WAYS TO BUILD A BETTER
REFRIGERATOR . . . AND AT THE SAME TIME TO
CUT PRODUCTION COSTS . . . IN 1935

that builds customer good-will by keeping refrigerating costs at a minimum.

3. Factory-fabricated sets—

In addition to being light in weight, odorless, and structurally strong, Armstrong's Temlok is easy, quick, and economical to install. For your convenience, it's supplied in factory-fabricated sets ready for use. You can secure Temlok cut to size in any thickness. It is made in full half-inch and full one-inch thicknesses, and is furnished in built-up layers as desired.

4. Made by a nationally-known manufacturer—

Temlok-insulated refrigerators are easier to sell because consumers know the name Armstrong. They recognize Armstrong as the maker of famous Armstrong's Linoleum and other high quality products.

5. Use of life test room—

As a user or potential user of Armstrong's Temlok, you are entitled to the use of Armstrong's Life Test Room. Here, under accelerated conditions of temperature and humidity, it is possible to approximate the usage your cabinets will receive in a lifetime of

service. Results are checked, valuable information obtained, and Armstrong bears the full expense of testing. You simply supply one or more cabinets.



LIFE TEST ROOM where refrigerators are given tests which approximate a lifetime of normal service.

GET THE
FULL FACTS . . . TODAY

It will pay you to carefully investigate Armstrong's Temlok before signing your insulation contract for next year. Discover for yourself the important reasons why leading refrigerator manufacturers standardize on this rigid fibreboard insulation. If you would like to have a representative call, or if you desire further data and samples, write today to Armstrong Cork & Insulation Company, 917 Concord Street, Lancaster, Penna.



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REFRIGERATOR INSULATION

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PRODUCTS

COMMERCIAL EVAPORATORS

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CONDENSERS

METLFLEX ICE TRAYS

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STEEL OR COPPER PIPE

McCord
RADIATOR &
MFG. CO.
DETROIT. - MICH.

Causes & Remedies Of Service Calls On Holmes Units

(Concluded from Page 13, Column 5)
have secured the proper liquid level. See "Liquid Levels," explained last week.

Cause B—Air Circulation

1. Lack of ventilation around condensing unit, or a machine placed in a very hot location will also cause excessive running. Make sure that the unit is placed in as cool a location as possible and that there is provision made for free air circulation around it.

2. Leaving doors open and overloading the refrigerator will cause excessive running.

3. If dust and dirt have been allowed to accumulate between the fins of the condenser so that there is no air being drawn through the condenser by the fan, pressure will be built up and the machine will run very long periods. The fins of the condenser should be thoroughly cleaned of lint and dust every three months.

Machine Runs Continuously

Cause A—Electrical Trouble

1. If the thermostat is stuck in the operating position, or the thermostat cord is shorted, the machine will run continuously and refrigerator will be very cold. Remove thermostat plug. If machine continues to run and the plug is removed, it will indicate a short in the thermostat cord or wire connection. Trace out this short and correct it.

2. If machine stops when the cord is removed from the thermostat, it

is possible that the thermostat may be shorted or stuck in the operating position.

To Test

Place a thermometer at the bottom of the freezing compartment of the chilling unit. Be sure it is in direct contact with the metal wall of the chilling unit. Allow it to remain there long enough to register the proper temperature. The thermometer should register about 18° F. If the temperature is much below this point and the chilling unit is frosted up properly, it is apparent the thermostat is not operating.

Cause B—Overcharge of Refrigerant

1. If the machine is heavily overcharged, machine will operate continuously and there will be very little or no refrigeration. If unit is overcharged, purge off gas at float housing until you have secured proper liquid level. See "Liquid Levels," in Oct. 17 issue of the News.

Cause C—Valves Stuck

1. If for any reason the float valve should be held in the open position, high pressure gas from the condenser would be allowed to flow freely into the chilling unit. This would prevent any refrigeration and the machine would run continuously.

As the high pressure gas would be passing directly into the chilling unit, the operating pressure of the chilling unit would be so high, that there would be refrigeration. Put on the vacuum gauge, and observe gauge reading.

2. If the check valve is stuck in closed position, the compressor would be unable to draw gas from the chilling unit. As a result the chilling unit would warm up and the machine would run continuously.

To test the check valve install vacuum gauge. Loosen $\frac{3}{8}$ -in. nut connecting the tube from the chilling unit to the check valve. If the chilling unit is warm, gas should blow out around the threads of this nut when it is loosened.

If the chilling unit is cold, there will probably be a small vacuum in the chilling unit. Gas will not blow out around the threads. Take the nut off. Start the machine. Hold your finger over the inlet connection of the check valve. If the check valve is stuck, your vacuum gauge will register a high vacuum and there will be no suction against your finger.

If the check valve is open, the suction of the compressor will tend to draw your finger into the opening of the valve connection. In making this test, care must be used not to draw a large amount of air into the compressor. Your pressure gauge should be installed and the pressure should never be allowed to exceed 35 lbs.

Machine Does Not Refrigerate or Refrigerates Too Slowly

Cause A—Thermostatic Trouble

If the thermostat is not properly adjusted or if range is set too close, the thermostat will cause the machine to operate with the chilling unit at such a temperature that there will be very little or no refrigeration.

Test the temperature of the chilling unit in the freezing compartment. If the machine stops at a temperature too high, examine the thermostat and if necessary, replace. (See instructions in Oct. 17 issue).

Refrigerator Too Cold

Electrical Circuit Out of Order

1. If a thermostat is shorted or stuck in the operating position, the machine will continue to run and the refrigerator will become too cold. Test thermostat and if found defective, replace it.

2. Examine the thermostat cord as it may be shorted. If it is, when the cord is disconnected from the thermostat, the machine will continue to run. If you find a shorted thermostat cord, the short will have to be repaired or a new cord installed.

Machine Does Not Freeze Ice Cubes

Cause A—Undercharge of Ethyl Chloride

If the machine is short of refrigerant, the chilling unit will not become cold enough to freeze the water in the ice trays. It is possible the refrigerator itself will be cold enough, but cubes will not freeze or, at best, it will require a very long time for them to freeze.

The remedy for this is to check the machine to determine if there is a proper charge and if it is found to be short, to add sufficient ethyl chloride to properly balance the charge. (See charging instructions in Oct. 17 issue).

Cause B—Thermostat Not Operating Properly

It may be possible that the thermostat is out of adjustment, stopping

the machine before the chilling unit is cold enough. Test the thermostat by taking the temperature of the freezing compartment in the chilling unit. Instructions for this operation are given above. If the thermostat is found to be out of adjustment, replace it.

Cause C—Wrong Kind of Water Used

1. Water high in mineral content is slower to freeze than distilled water. Trouble with water is very often encountered in localities where the city supply comes from artesian wells. If you have a suspicion this is causing your trouble, secure a supply of distilled water and check its freezing time against the city supply.

Urge the customer to refill the ice trays as soon as they are emptied, placing the refilled trays in either the top or bottom core. The top and bottom cores freeze more rapidly than the center cores. If the user will do this, we will be assured of a liberal supply of cubes at all times.

Cause D—Location of Refrigerator

During cold weather if a refrigerator is placed in a cold pantry or on an outside porch, the air surrounding it will be as cold or colder than the desired temperature inside the refrigerator. Under this condition, the machine will run at very infrequent intervals.

The infrequent operation will not maintain a temperature in the ice freezing compartment sufficiently cold to freeze the water with the result, that while the refrigerator will be cold enough to preserve foods, there will not be a supply of ice cubes.

Machine Short Cycles

Cause A—Too Much Frost On Chilling Unit

If the chilling unit is not defrosted at frequent intervals, the coating of frost will continue to accumulate to such an extent, that it will block the free circulation of air and will also act as an insulator, slowing up the transfer of heat through the chilling unit. The remedy is to defrost the chilling unit and to instruct the user to do this at more frequent intervals.

Cause B—Poor Air Circulation

If there is not a free movement of air throughout the refrigerator, the chilling unit will cool down rapidly and the thermostat will stop the machine. However, the temperature of the chilling unit will rise rapidly, and the machine will start again.

Poor air circulation is caused by placing paper, wood or glass on the wire shelves of the food compartments. It is also caused by placing food containers too close together on the shelves and by using improper containers for food storage.

Cause C—Door Leakage

If the doors are not properly fitted or if the gaskets on the doors have become worn, an excessive amount of warm air will leak into the refrigerator. The heat from this air, will naturally flow to the chilling unit and cause the machine to start at frequent intervals. Adjust the door latch or hinges, or place new gaskets on the doors.

Cause D—Defective Thermostat

A thermostat set at an improper range, will cause this condition. Test the thermostat, as described above.

Cause E—Check Valve Stuck Open

If, when the machine automatically stops, the check valve fails to seat properly, warm gas from the compressor will be allowed to back up through the suction line into the chilling unit. This will warm up the evaporator and cause the thermostat to start the machine at frequent intervals.

This condition can usually be detected by listening carefully to the compressor just when it stops. If there is a very pronounced leak, you will be able to hear the high pressure gas force its way through the rotor and into the suction line.

General Complaints

A—Noise

1. Noise may be caused by loose fan motor striking against the shroud or condenser.

2. Shipping washers and bolts may have loosened and left in contact with the machine.

3. The refrigerator may not be level causing vibration.

4. A check valve may chatter.

5. Refrigerator may be installed on single wood floor. To remedy, place felt pad under legs of cabinet.

6. If the wire shelves are not placed evenly and securely upon the hooks, the operation of the machine will cause them to vibrate and rattle.

B—Machine Runs Hot

1. Compressor and motor may be low on oil. Inspect oil level. Compressor may be operating, but condenser fan may be stuck. Make sure the fan is revolving freely. If not, repair or replace the fan.

C—Ice Cubes Frozen But Refrigerator Not Cold

This condition can be caused by excessive leakage around the doors, or poor air circulation inside the refrigerator. This air circulation is restricted by the improper placing of foods, overloading refrigerator and placing paper, glass or wood on the food shelves. A heavy coating of frost on the chilling unit will also cause this condition.

Description of Holmes Refrigerators

The Holmes was furnished in six different sizes. They were known as: H-45, H-55, H-75, H-90, D-60, D-80. The refrigerating unit is the same in each case. The "H" models are made of armo iron. The interior is of white porcelain enamel. The insulation consists of $2\frac{1}{2}$ -in. cork. The boxes are finished with five coats of Duco.

The base of the refrigerator is divided by an insulated partition, part of the space being used for the installation of the machine and the balance as a vegetable compartment. Models H-45 and H-55 have one large door opening into the food compartment and another single door which opens up the vegetable and meat compartment.

Models H-75 and H-90 have two food compartment doors and two doors on the base of the refrigerator. At present, Mr. Clark is giving all instruction, but plans to employ assistants as they are needed. Called the Detroit School of Refrigeration, it is said by its president to be the first refrigeration trade school licensed by the state of Michigan.

Mr. Clark was graduated from the University of Michigan in 1926 with a degree in mechanical engineering. He spent more than a year with Underwriters Laboratories in Chicago, followed that with a year in Copeland Products, Inc., and two years with the Detroit Lubricator Co. Edgar C. Neill is vocational director.

Refrigeration School Opened in Detroit

DETROIT—A refrigeration and air-conditioning school in which all training is to be given by personal instruction opened its doors here Oct. 1. It is headed by George H. Clark of Mercier & Clark, Inc., local service company, and at present has 12 students enrolled.

The course consists of 26 lessons, and is designed for completion by the average student in six months of study—two four-hour classes each week and eight hours of home preparation for this classroom. A year may be taken for the course if the student desires. Cost is \$125.

At present, Mr. Clark is giving all instruction, but plans to employ assistants as they are needed. Called the Detroit School of Refrigeration, it is said by its president to be the first refrigeration trade school licensed by the state of Michigan.

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A complete list of manufacturers of refrigeration systems, equipment, parts, materials, supplies, production and service tools, related products, companion merchandise, material handling and delivery equipment, and other devices and services used by the industry. Also detailed specifications of all models of all makes of household and commercial refrigeration equipment and all available statistical data on past sales of refrigeration equipment and the potential future market.

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QUESTIONS

Display Case Doors

No. 1902 (Manufacturer, Missouri)—"Please give me addresses or location for manufacturers of rubber doors for refrigerators. We are building a number of freezer cases, but intend to buy doors and frames."

Answer: Rubber doors for display cases are manufactured by the following concerns:
American Hard Rubber Co.
11 Mercer St., New York City.
Luzerne Rubber Co.
Trenton, N. J.
Miller Rubber Products Co.
S. High St., Akron, O.

Specification Data

No. 1903 (Missouri)—"I would like to have a magazine or booklet on complete data and prices on domestic and commercial refrigerating

units. Please let me know by return mail if you have same or where same can be had."

Answer: See below.

No. 1904 (Manufacturers' Representative, Illinois)—"I am anxious to secure, if available, a copy of ELECTRIC REFRIGERATION NEWS giving the current retail prices for the different models offered by the several leading makes, like Kelvinator, Frigidaire, General Electric, Gibson, Universal Cooler, etc."

"I remember that such information appeared in the News several years ago, when I had occasion to read it regularly, and if I could secure similar information now it would be extremely helpful in drawing the conclusion I am trying to reach. Any information that you may be able to give me along this line would be much appreciated."

Answer: Complete specifications covering 285 models of the 37 makes of household electric refrigerators were published in the May 30 issue of ELECTRIC REFRIGERATION NEWS. Information was included for size and type of refrigerating machine used, dimensions and storage capacities of

cabinets, retail prices and other data. In the September 12 issue, specifications were published for commercial refrigerating machines manufactured by 22 concerns. Dimensions, refrigeration capacity, type or system, motor size and other data were given, but prices of the various units were not included.

Refrigerator Cabinets

No. 1905 (Service Co., New York)—"Will you please send us a list of household electric refrigerator cabinets, as we are interested in purchasing a quantity of four and five-foot boxes?"

Answer: See page 287 of the 1934 REFRIGERATION DIRECTORY for the names of manufacturers of household electric refrigerator cabinets.

'Petro-Frost' Refrigerator

No. 1906 (Engineers, New Jersey)—"In an effort to locate the name and address of the manufacturers of the Petro-frost domestic refrigerator, we were referred to you for this information."

"If you will be kind enough to send us this information it will be appreciated very much."

Service Information

No. 1907 (Georgia)—"Please send me something on the Electrolux and a chart of relative pressures and temperatures of all commercial refrigerants."

Answer: A description of the new air-cooled Electrolux was published in the March 29, 1933, issue of ELECTRIC REFRIGERATION NEWS.

For a chart of pressures and temperatures of common refrigerants, see page 10 of the Aug. 22, 1934, issue of the News.

Employment of Salesmen

No. 1908 (New Jersey)—"Can you advise me as to how many men are regularly occupied in the sale of:

Commercial refrigeration
Air-conditioning equipment
Oil burners."

Answer: No figures available.

Stewart-Warner Midget

No. 1909 (Dealer, Illinois)—"In one of your recent issues, there was a picture on the front page of a Stewart-Warner midget refrigerator.

The writer has misplaced this issue and would appreciate it if you would forward a copy at your earliest possible convenience."

Answer: The picture of the Stewart-Warner lift-top electric refrigerator was published on page 1 of the August 15 issue of the News.

Concerning the News

No. 1910 (Pennsylvania)—"I am interested in electric refrigeration and air conditioning, particularly in construction, and trouble and repair of both these machines."

"I would like the knowledge to cover all makes of refrigerators and air-conditioning plants. If you have anything that would fill these requirements, kindly let me know at your earliest convenience."

Answer: ELECTRIC REFRIGERATION NEWS, weekly business newspaper of the refrigeration industry, reports current events in the refrigeration industry and announces new equipment placed on the market. During the past year and more, considerable attention has been devoted to air conditioning, one issue of each month specially featuring air conditioning.

During the summer, a series of articles giving instructions for servicing various makes of refrigeration machines has been published. These articles furnish service information on obsolete machines for which such data is no longer readily available, and have been reported as very valuable to service men and others.

Refrigerators for Export

No. 1911 (Exporter, New York)—"We are interested in getting into the export of refrigerators and refrigerator parts. Would you be in a position to supply us with the name of any manufacturers of this equipment whom you think might be interested in making some arrangement?"

Answer: Manufacturers of household and commercial electric refrigerators, parts, supplies, materials and accessories are listed in the 1934 REFRIGERATION DIRECTORY.

Ice Cream Freezers

No. 1912 (Manufacturer, England)—"Please let me have the names and addresses of American manufacturers of vertical ice cream freezers of a capacity from 1 to 4 gallons, such freezers are to be incorporated in ice cream cabinets for retailers and small manufacturers of ice cream. These freezers are held in the brine alongside the sleeves for the conservators."

Answer: See page 224 of the 1934 REFRIGERATION DIRECTORY for manufacturers of ice cream freezers.

Foreign Manufacturers

No. 1913 (Exporter, New York)—"We note from the question box in your October 10 issue that you are endeavoring to obtain a list of British and French domestic refrigerator manufacturers."

"If you are successful, we, also, would appreciate a copy of these lists."

"Should you obtain such lists covering similar manufacturers in other foreign markets, we would also be interested in receiving copies."

Answer: The list of British and French refrigerators has not as yet been obtained, but if such a list is secured it will probably be included in the 1935 edition of the REFRIGERATION DIRECTORY.

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tions, but a survey made early in 1934 and published on pages 465 through 469 of the DIRECTORY gives a record of installations in 12 major American cities for the period prior to 1933 and for the year 1933.

Air-Conditioning Fan

No. 1917 (Engineers, Australia)—"If you will be good enough to refer to page 14 of April 12th issue of ELECTRIC REFRIGERATION News of last year (1933), you will note an article on a special fan blade developed for air-conditioning work.

"Now we were very much interested in obtaining particulars of this, and wrote to the General Regulator Corporation of Chicago (this being the only address we had) but the letter was returned from the Dead Letter Office.

"Would it be possible for you to put us in touch with the manufacturers of these fans on which we would like prices, sizes, output, driving power and so on?"

Answer: General Regulator Corp., manufacturer of the Duo-Gyrovane air conditioning fan, should be addressed at 2608 Arthington St., Chicago, Ill.

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No. 1914 (Manufacturer, New York)

"Would you kindly advise us, if possible, what concern manufacturers the Mayson Automatic Expansion Valve. We would very greatly appreciate the name and address of this concern of any suggestion you may have to help us obtain information in this matter."

Answer: The Mayson Automatic Expansion Valve is made by the Mayson Manufacturing Co., 4332 Horatio Ave., Detroit, Mich.

Monthly Sales

No. 1915 (Manufacturer, New York)

"Can you furnish us statistics on the monthly sale of electric refrigerators for the years 1933 and 1934 to date? If you cannot give us these statistics can you tell us where we can secure them?"

Answer: A comparison of household electric refrigerator sales by months for 1933 and 1934 was published on page 14 of the October 3 issue of ELECTRIC REFRIGERATION News. The tabulation showed sales by 35 industry manufacturers in comparison with those by members of the Refrigeration Division of the National Electrical Manufacturers Association (Nema). The figures represent shipments to distributors and dealers throughout the world.

Yearly Refrigerator Sales

No. 1916 (Manufacturer, Pennsylvania)

"We are working up a little sales literature and would like to have the total number of electric refrigerator sales during each of the past 10 years, so that we can plot a curve."

"We would also like to have the same information on air-conditioning equipment for all installations except theaters and industrials."

Answer: Sales estimates of household electric refrigerators in both number and retail dollar volume have been made by ELECTRIC REFRIGERATION News for the years 1920 through 1933. This information is given in the 1934 REFRIGERATION DIRECTORY in both tabular and chart form on pages 472 and 473. An estimate of unit sales for the first eight months of 1934 was published on page 18 of the Oct. 3 issue of the News.

Similar information by years is not available for air-conditioning installations.

Answer: General Regulator Corp., manufacturer of the Duo-Gyrovane air conditioning fan, should be addressed at 2608 Arthington St., Chicago, Ill.

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